Information Circular 86-1

NEW BRUNSWICK'S MINERAL INDUSTRY
1985

Edited by
Barbara M. W. Carroll

Mineral Resources Division
Department of Natural Resources and Energy
Province of New Brunswick
1986

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PREFACE

This is the ninth in a series of reports on the mineral industry of New Brunswick. The information contained within the report, which is not contained in our normal series of reports, will serve as a historical record of exploration, development, mining and government activities as well as related matters that have taken place within the Province during 1985.

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CHAPTER 1. GOVERNMENT PROGRAMMES

MINERAL RESOURCES DIVISION[1]

New Brunswick, like other provinces in Canada, has traditional responsibilities with respect to the mineral resources it owns and controls. It administers, through a number of Acts, all matters related to the exploration, development, production, smelting, refining, transportation and taxation of its basic metallic, nonmetallic and structural material resources. The Minister of Natural Resources has sole responsibility of these Acts, which are administered by the Mineral Resources Division of the Department of Natural Resources.

The first attempt by the Government of New Brunswick to evaluate its mineral potential was made in 1838 when Dr. Abraham Gesner was appointed to carry out a geological survey of the Province. Gesner was probably the first provincial geologist in Canada, and New Brunswick the first to initiate a formal geological survey. An astute and enthusiastic observer, Gesner stated in his first of four reports published in 1839:

> "The geological and mineralogical exploration of New Brunswick was commenced under circumstances truly embarrassing; but, from the results already produced, it cannot fail to mark a new era in the history of the Province. It will be seen in the body of this report, how important this inquiry is to the prosperity of the country, and so great are the discoveries already made, even in the commencement of the undertaking, that the names of those who have supported the object will be remembered with gratitude by succeeding generations.
>
> "Hitherto the energies of the Province have been directed to the exportation of timber in its different forms, and the commerce of the Colony has been greatly enlarged from the fine forests which formerly occupied the interior of the country. But timber is gradually becoming more scarce, the expense of procuring it is annually increasing, and the time will come when other objects for exportation must be sought for. It is then certainly desirable that other resources of the country should be opened, and while the agricultural districts are encouraged and protected, the riches contained in the bosom of the earth should not be overlooked."

The results of Gesner's work stimulated much interest and discussion. There was new awareness of the geology and mineral potential of the Province, and a general positive attitude toward industrial development. Gesner was followed by government, university and other geologists including James Robb, L. W. Bailey, G. F. Matthew, C. F. Hartt, R. W. Ells, C. Robb, R. Chalmers, H. S. Poole and H. Y. Hind. After Confederation in 1867, basic geological surveys were continued by the same workers, but under the employ of the Geological Survey of Canada.

In 1816, an Act for the Encouragement of Trade in Gypsum was passed. A mining lease for coal was issued in 1835, and in 1858 the first act related specifically to mines and minerals was passed. It dealt mainly with mining licences. The General Mining Act of 1891 contained many principles of current legislation, including mining claims, called prospecting licences at that time. An Act to Encourage the Discovery and Development of Oil and Natural Gas was introduced in 1899, and in 1927 the General Mining Act was passed. It contained most of the concepts of the present act. The Ownership of Minerals Act was passed in 1953, and the Mining Income Tax Act in 1954. Other important legislation passed included the Bituminous Shale Act (1967), the Quarriable Substances Act (1968), the Pipeline Act (1976), and the Underground Storage Act (1978).

The basic one-inch-equals-four-mile bedrock and surficial geological mapping of the Province was completed about 1900. In the years prior to and after World War I, the Provincial Government adopted a passive role toward mineral development. At that time, only a few limestone, gypsum, and building stone quarries were in operation, plus the coal mines at Grand Lake and the oil-gas field at Stoney Creek.

The foundations for the growth and development of New Brunswick's mineral industry were laid in 1926 when a modern mining act was passed in the legislature. Dr. W. J. Wright was hired as Provincial Geologist and the Province began to adopt a more active approach toward the development of its mineral resources. Much basic mapping was completed by both the then Department of Lands and Mines and by the Geological Survey of Canada. University students and professors were also actively involved in this work, particularly Dr. G. S. MacKenzie, S. C. Perry, F. J. Alcock and others. The new Mining Act, the Government's positive approach toward investment, as well as the basic surveys carried out by Dr. Wright and his colleagues, were basic ingredients for the growth of the mineral industry as we know it today.

After World War II, there was considerable growth in the development of peat bogs in the northeastern part of the Province. A new cement plant was also constructed at Havelock.

The Mines Branch of the Department of Lands and Mines was staffed by less than six employees at the time base metals were discovered in the Bathurst-Newcastle area in late 1952. They were completely unprepared for one of the largest staking rushes in Canadian mining history which followed in 1953. The main concern was, at that time, administration of mineral rights. Northern New Brunswick was explored quickly, and by 1960 more than 30 base metal deposits of various sizes had been discovered. Progress was slowed down by an economic recession in 1957-58; however, by the mid-sixties the Wedge, Brunswick, Heath Steele and Nigadoo mines were in production. A zinc-lead smelter and fertilizer plant were constructed at Belledune on Bay of Chaleur, and the Province's base metal industry was becoming firmly established.

In 1964 the Province recognized the potential for growth of mining, and enlarged the staff of the Department of Lands and Mines to evaluate the mineral potential of other relatively unexplored parts of New Brunswick. This work was completed in 1970 when the new Mines Division of the Department of Natural Resources and the Canada Department of Regional Economic Expansion signed a $3 800 000 agreement to accelerate basic geological surveys, conduct feasibility studies for further processing, and do other work to stimulate investment. One of the projects included the diamond drilling of salt structures in the Sussex area, which resulted in the discovery by geologists of the Department of Natural Resources of economically interesting potash and high-grade salt at three locations. Fortunately, subsequent exploration by experienced companies has been successful, and the three areas of potash potential identified are now at various stages of development. The first muriate of potash was shipped from the Potash Company of America mine in late 1983. A second $11 300 000 agreement was signed in 1975. More basic geological work was completed as well as extensive inventories of granular aggregate, peat and industrial minerals. Further research related to methods of improving metal recoveries was also completed. Resource roads were built and special emphasis was placed on programmes to make the public more aware of the contributions of the mineral industry to the economy of the Province.

On June 21, 1984, a five-year $22 300 000 agreement was signed to initiate a number of programmes to be carried out by the Mineral Resources Division of the New Brunswick Department of Natural Resources (DNR) and the Canmet and Geological Survey Branches of the Canada Department of Energy, Mines and Resources (EMR). There are four main programmes, all designed to promote the exploration, development, mining, smelting, refining and marketing of the Province's minerals. EMR's share of the agreement totals $15 000 000, and the Province's share totals $7 300 000.

The relationship of the Mineral Resources Division to other divisions of the department is shown in Figures 1a, 1b and 1c.

GEOLOGICAL SURVEYS BRANCH[2]

The Geological Surveys Branch is responsible for the collection and dissemination of information pertaining to the geology and mineral deposits of New Brunswick. Closely associated activities include the encouragement of mineral

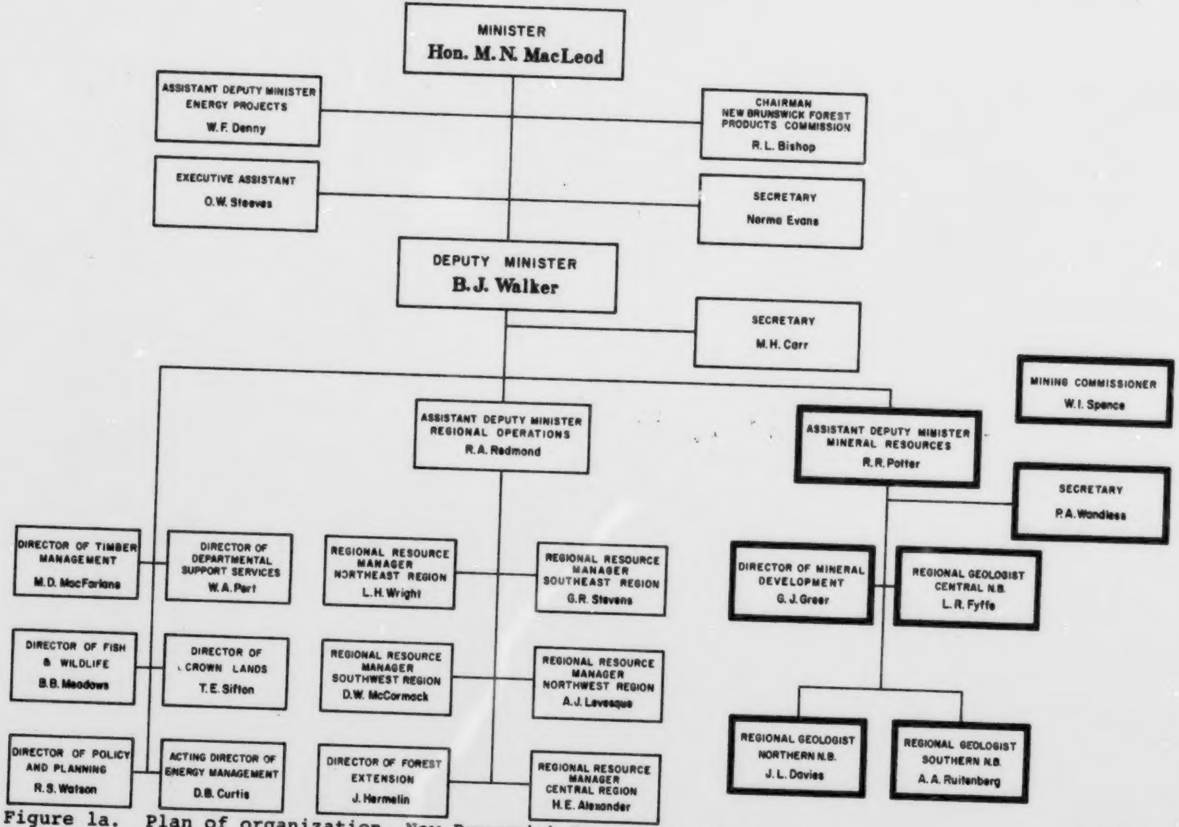
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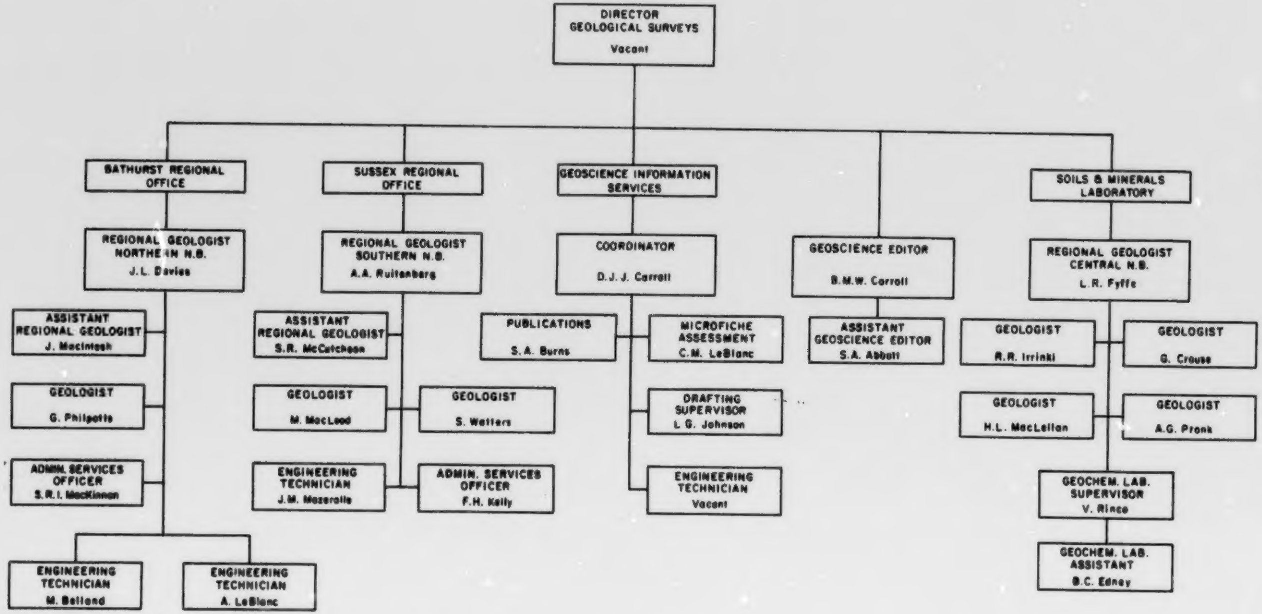
Figure 1a. Plan of organization, New Brunswick Department of Natural Resources.

December, 1985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ENGINEERING TECHNICIAN
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Figure 1b. Plan of organization, Geological Surveys Branch.

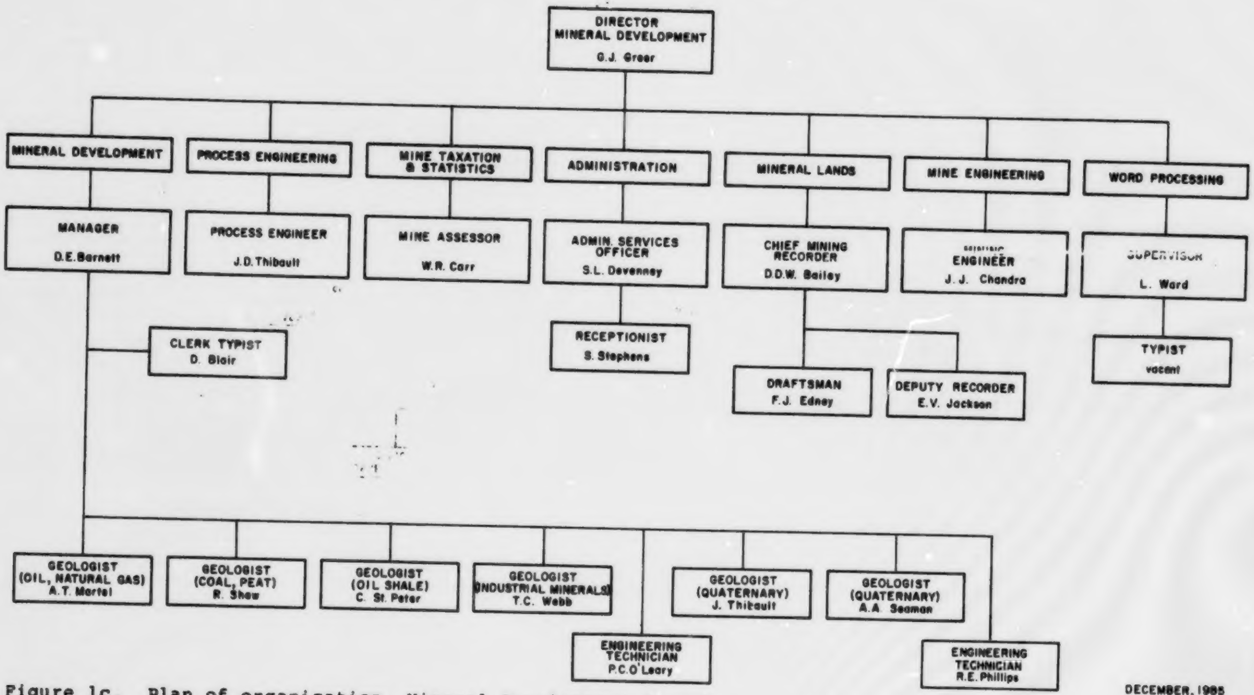
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Figure 1c. Plan of organization, Mineral Development Branch.

DECEMBER, 1985

exploration, the promotion of the mining industry, and assistance to those who formulate resource and land use policies. Although the activities of the Branch since its formation have been aimed at helping the mineral industry, there is an increasing awareness and use of geological knowledge in land use planning, environmental evaluations, engineering projects, and ground water studies. The principal objective of the Branch is to provide a complete and up-to-date inventory of geological data to stimulate and guide mineral exploration, and to encourage sound resource planning.

Numerous field projects were carried out in 1985, mainly in the areas of higher mineral potential in northern and southern New Brunswick. Projects included mineral deposit studies, regolith mapping, drill core collection and storage, geoscience data management, prospecting courses, preparation of public displays and continuation of stream silt geochemical surveys.

A large part of the Branch's activities in 1985 was carried out under the Canada-New Brunswick Mineral Development Agreement (MDA). This accord entails an expenditure of $22 300 000 over a five-year period on geoscience, mineral technology, and public awareness programmes.

John B. Hamilton, Director of the Geological Surveys Branch, retired in June of 1985. He was with the Department for 28 years, and in that time has made a considerable contribution to the identification and understanding of the Province's mineral resources. In 1983, Mr. Hamilton received the Dr. W. J. Wright Award, sponsored by the New Brunswick Branch of the Canadian Institute of Mining and Metallurgy, as a recognition of his achievements. For a number of years, he has represented New Brunswick on the Committee of Provincial Geologists and in 1984-85 was the Committee chairman.

Bathurst Regional Office[2]

The staff of the Bathurst Regional Office in 1985 consisted of J. L. Davies (Regional Geologist), J. A. MacIntosh (Assistant Regional Geologist), Sharon McKinnon (Administrative Services Officer), André LeBlanc and Maurice Belland (Engineering Technicians).

PROGRAMMES The field work conducted from the Bathurst Regional Office in 1985 was primarily financed from MDA funds. Provincial budget levels were insufficient to sustain intensive field activities.

PROVINCIAL PROJECTS J. A. MacIntosh undertook a modest programme to assess the gold deposit potential of parts of the California Lake (21 O/8), Tetagouche Lakes (21 O/9), and Nepisiguit Falls (21 P/5) map areas. This project comprised a compilation of assessment report data, and the splitting of selected diamond drill core stored at the Bathurst Regional Office (Figure 2). The core was selected on the basis of pyrite and/or pyrrhotite, and carbonate content; however, some quartz veins were also assayed. One hundred and twenty-two samples were assayed for gold and arsenic.

Figure 2. Jim MacIntosh examines core at the Bathurst Regional Office.

MDA PROJECTS G. Philpott and J. L. Davies began a project to study the stratigraphic and structural relationships of the gold deposits of the Nigadoo River-Millstream River area (Figure 3). The geology of the area was completed on several 1:20 000 maps and several gold occurrences were investigated in detail: Stephens Brook (mineral occurrence no. 21*), Lavigne Brook (no. 90*), Bradley Brook (Zarina, no. 105*), Millstream west (no. 91*), and Bradley Brook (no. 104*). Although the emphasis was on the terrane along the Rocky Brook-Millstream Fault system, some work was also carried out on the Nigadoo gold occurrence (no. 106*) farther north.

The geocompilation project, which involves the plotting of all exploration assessment work, was started. Maritime Resource Management Services prepared 1:10 000 base maps for two (21 O/8, 21 P/5) of the nine 1:50 000 map areas to be covered (Figure 3). A large microfiche enlarger-printer purchased for the project will greatly facilitate the plotting of data, and result in substantial savings to the Department in the long term.

OTHER ACTIVITIES Work continued on revisions to previously published geological maps and to the mineral deposits file. Mineral deposit data has been compiled by D. W. Hattie for a proposed metallogenic map of New Brunswick.

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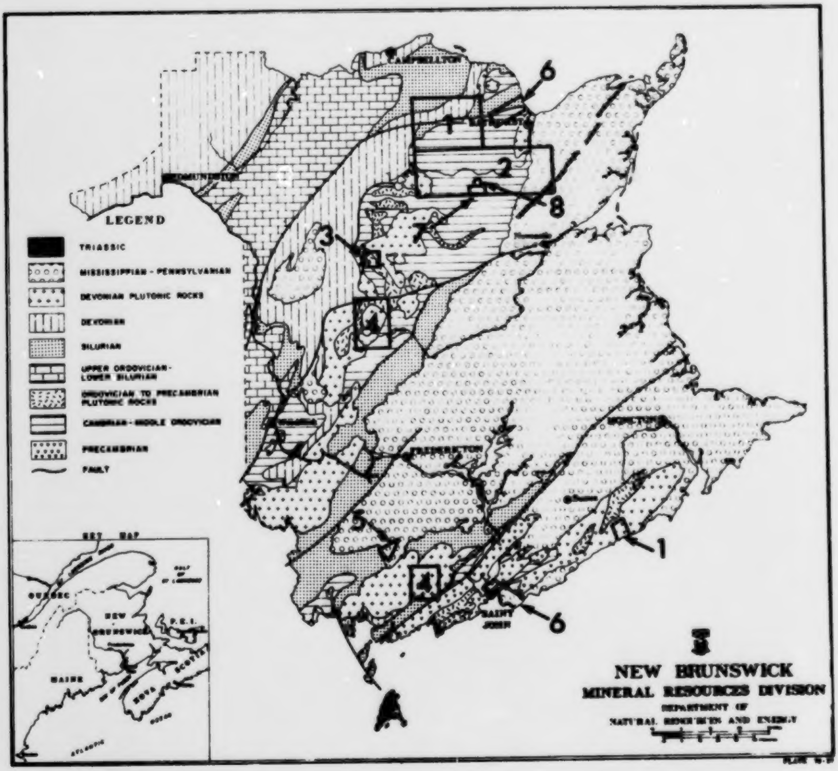
* numbering system used at the Bathurst Regional Office.


CAMPBELLTON
EDMUNDSTON
FREDERICTON
MONCTON
SAINT JOHN
1
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8
LEGEND
TRIASSIC
MISSISSIPPIAN - PENNSYLVANIAN
DEVONIAN PLUTONIC ROCKS
DEVONIAN
SILURIAN
UPPER ORDOVICIAN-LOWER SILURIAN
ORDOVICIAN TO PRECAMBRIAN PLUTONIC ROCKS
CAMBRIAN - MIDDLE ORDOVICIAN
PRECAMBRIAN
FAULT
KEY MAP
QUEBEC
NEW BRUNSWICK
P.E.I.
MAINE
NOVA SCOTIA
ATLANTIC
NEW BRUNSWICK
MINERAL RESOURCES DIVISION
DEPARTMENT OF
NATURAL RESOURCES AND ENERGY

Figure 3. Areas in which the Geological Surveys Branch conducted studies in 1985: (1) surficial and till mapping; (2) geoscience compilation project; (3) amphibolite study; (4) granite studies; (5) Mount Pleasant caldera project; (6) gold deposit studies; (7) geological mapping; and (8) Stratmat study.

The Regional Geologist presented two papers at the annual meeting of the Geological Association of Canada/ Mineralogical Association of Canada Joint Annual Meeting (GAC/MAC) held in Fredericton. One dealt with the geology of the Miramichi Zone and its sulphide deposits, and the other with the geology of the Restigouche and Murray Brook sulphide deposits. He also co-authored with A. A. Ruitenberg, a paper on the gold deposits of New Brunswick.

Several guided tours were conducted in northern New Brunswick in 1985, including one in association with the GAC/MAC for which a guidebook was prepared.

Assistance was rendered to two University of New Brunswick graduate students: Karen Kettles in her study of the Turgeon sulphide deposit, and G. A. Alcott in his investigation of the geophysical parameters associated with the Heath Steele and Cominco Stratmat sulphide deposits.

André LeBlanc and Sharon McKinnon were busy in matters associated with the widespread gold exploration and related claim staking (Figure 4). Mr. LeBlanc also aided in the discussions with landowners from the Alcida area who are negotiating agreements with Lacana Mining Corporation Ltd.

Figure 4. Greg Philpott discusses his gold deposit study with Sharon McKinnon at the Bathurst Regional Office.

M. Belland continued his compilation of exploration assessment work, concentrating his efforts on the Rocky Brook-Millstream Fault zone. Mr. Belland also assisted the Regional Geologist in coordinating forestry operations and exploration activities.

J. A. MacIntosh and J. L. Davies assisted local authorities in the planning of the Petit Rocher Mining Interpretation Centre. In 1985, the planning committee hired a geography student to compile a history of mining and to prepare various theme maps for display in the centre.

The Regional Geologist spent a substantial amount of time editing maps and reports in preparations for their publication, and he also served on committees pertaining to the experimental sulphide roast-leach plant in Chatham and professional development in the Department of Natural Resources.

Sussex Regional Office[3]

The Sussex Regional Office staff in 1985 consisted of A. A. Ruitenberg, Regional Geologist; S. R. McCutcheon, Assistant Regional Geologist; M. R. Mazerolle, Engineering Technician; and F. H. Kelly, Administrative Services Officer. M. J. McLeod and S. E. Watters were hired on long-term contracts as part of the Mineral Development Agreement between the Government of Canada and the Province of New Brunswick.

PROGRAMMES AND PROJECTS Field programmes were continued in the Bay of Fundy gold-bearing zone (Figure 3). S. E. Watters conducted detailed stratigraphic, structural and mineralogical studies between Cape Spencer and the City of Saint John. Rock samples were chemically analyzed to determine background values and abundances of precious and base metal elements in altered rocks. Samples from the Gordex Minerals Ltd. gold extraction heap were processed in order to study the gold content of heavy mineral concentrates.

A. A. Ruitenberg continued a detailed geologic investigation of the gold-bearing rocks in the Cape Spencer-Black River area (21 H/4), with emphasis on newly discovered occurrences in the Millican Lake area. He also commenced a comparative study of gold deposits in the Province. Gold-bearing samples were submitted to J. A. R. Stirling of the New Brunswick Research and Productivity Council for microprobe analysis, and preparation of polished and thin sections.

M. J. McLeod studied the tin- and tungsten-bearing rocks of the western part of the eastern Saint George Batholith (Figure 3), and a preliminary map was prepared. Various phases of the granite and tin- and tungsten-bearing greisens were sampled for detailed petrography, chemical analysis and age dating. An economically interesting tin-bearing greisen zone and an extensive dilatent shear zone with gold potential were delineated as a result of this survey.

S. R. McCutcheon continued his investigation of the Mount Pleasant caldera as a Ph.D. thesis project at Dalhousie University, Halifax, N. S. Microprobe and oxygen-isotope studies mentioned in the report 'Review of Activities, Project Resumés 1985' are nearly complete. The Ar 39/40 age dating programme that was originally planned has been abandoned for the present because of time consideration. Preparation of the final report on the project is in progress.

Preliminary results of various aspects of the above-mentioned investigations were presented in the Annual Review of Activities of the Mineral Resources Division in Fredericton, the Annual Meeting of the Atlantic Geoscience Society in Amherst, the Annual Meeting of the Prospectors and Developers Association in Toronto, and a symposium on Granite-related Mineral Deposits organized by the Canadian Institute of Mining and Metallurgy in Halifax, N. S.

In addition to various long-term programmes, short-term projects were continued. S. C. Gouthro continued work, earlier started by D. W. Hattie, on setting up and checking a mineral occurrence file, and compiling a metallogenic map of the Province. A small-scale version of this map will be incorporated into a metallogenic map of the American and Canadian Appalachians. Preliminary planning was begun to computerize the mineral occurrence file.

Till mapping and sampling over mineralized zones was continued (Figure 3). The 1985 programme was conducted by P. G. Chiswell over the gold- and copper-bearing rocks in the Goose Creek area, west of Fundy National Park. The bedrock geology of this area was previously mapped in detail by M. J. McLeod.

Field trips to the tungsten-molybdenum-tin deposits of New Brunswick and the gold deposits in the Bay of Fundy coastal zone were organized for participants at the Joint Annual Meeting of the Geological Association of Canada/Mineralogical Association of Canada (GAC/MAC) in Fredericton. Field trips, similar to those for the GAC/MAC Joint Annual Meeting were organized for the symposium on Granite-related Mineral Deposits in Halifax. A special session on mineral deposits related to the tectonic evolution of New Brunswick, organized by A. A. Ruitenberg and A. L. McAllister for this meeting, comprised thirteen papers on the metallic and nonmetallic mineral deposits in the Province. They were presented by geologists from industry, the Mineral Resources Division and the University of New Brunswick. A field trip to gold deposits along the Bay of Fundy coast was provided for graduates of the prospecting course that was sponsored by the Geological Surveys Branch.

Consultations were provided for many geologists, prospectors and engineers during the year. The main interest continued to be gold deposits.

Assistance was also provided to the New Brunswick Department of Transportation to locate a suitable aggregate source for the new Saint John-Hampton Highway.

Geological advice related to forest site classification was provided to foresters. In cooperation with H. van Groenewoud, suitable forest sites were selected, and till sections described and photographed. This information will be incorporated into a field guide for the Fredericton meeting of the International Union of Forest Research Organizations that will be attended by representatives from Canada, the United States and Europe.

Soils and Minerals Laboratory[4]

Geological Surveys Branch staff at the Soils and Minerals Laboratory include L.R. Fyffe, R.R. Irrinki, G. Crouse (Geologists); V. Rinco (Geochemistry Labcratory Supervisor); and B.C. Edney (Geochemistry Laboratory Assistant).

GEOLOGY Two field programmes are presently being conducted as part of the Mineral Resources Division contribution to the Mineral Development Agreement (MDA) with the Federal government. A petrochemical and metallogenic investigation of tin-tungsten-bearing granites in the Burnthill Brook area of central New Brunswick (Figure 3) was initiated in the spring of 1985 under project geologist Elizabeth MacLellan. A preliminary geologic map of the Burnthill pluton has been prepared; samples from the granite and associated mineral showing have been sent for chemical analyses and radiometric age determinations.

Surficial mapping of the Tetagouche Lakes area (21 O/9) by Toon Pronk is another MDA project being carried out by the Geological Surveys Branch from the Fredericton office. Samples were collected at about 300 sites for pebble counts, mineralogic examination and geochemical analysis. B- and C-horizons were analyzed for Mn, Fe, Co, Ni, Cu, Zn, Mo, Ag, Cd, Pb, As, and Sb; concentrates of samples with anomalous values were also analyzed for Au, Sb, As, Ba, Hf, La, Mo, and Ta.

Previous mapping programmes in central New Brunswick pointed out some geological problem areas. Detailed mapping of these areas by L. R. Fyffe is continuing. The Sisson Brook tungsten-molybdenum deposit is localized along a fault contact between amphibolitic rocks of uncertain age and Cambro-Ordovician quartzites and phyllites of the Tetagouche Group. Several well-exposed sections of these amphibolites are being studied to better document field relationships between these rocks and Tetagouche Group rocks.

Samples from the Sisson Brook area in the south and from similar rocks of the Trousers Lake Complex in the north have been collected for chemical and radiometric studies. The chemical analyses should indicate whether the protolith of the amphibolite was a limy sedimentary or a mafic igneous rock. The possibility that the amphiolites are high-grade metamorphic equivalents of mafic volcanics of the Tetagouche Group will be examined by comparing their respective trace element chemistry. Argon-argon ages on hornblende separates will be used to establish metamorphic ages and cooling history of the amphibolites.

Map Report 86-1, Geology of Sisson Branch Reservoir (21 O/6) by R. R. Irrinki and G. W. Crouse was edited in 1985 and will be available early in 1986. The Big Bald Mountain area (21 O/1) map report is presently being edited and should be published in 1986.

GEOCHEMISTRY In 1985, 677 silt samples, collected from the California Lake area (21 O/8E) in 1984, were analyzed by Valeria Rinco at the Soils and Minerals Laboratory for Cu, Pb, Zn, Mn, Fe, Ag, Co, and Ni by atomic absorption, and for Mo and W by colorimetry. In addition, 819 till samples, submitted by Toon Pronk from the Tetagouche Lakes area (21 O/9), were run for the same elements by atomic absorption, whereas Mo and Sb were done by colorimetry. Further analyses of the till samples were performed by Bondar Clegg and Becquerel Labs Inc. (see page 13).

Silt samples, previously collected in the Serpentine River (21 O/2), Kedgwick (21 O/11), Upsalquitch Lake (21 O/10), and Tetagouche Lakes (21 O/9) areas in 1981, were sent to Chemex Labs for Au, As, Sb, and Ba analyses. A standard sample provided by the Geological Survey of Canada was inserted with every batch of 20 samples to determine analytical accuracy. The 1981 collection consisted of 2825 samples, of which 933 contained the required 15 g of silt needed for analytical precision.

CORE MANAGEMENT The ever-increasing amount of drill core being stored in Provincial repositories necessitated the appointment of a Core Librarian (Greg Crouse) and the implementation of a Core Storage Policy. This policy, which is presently being developed, will establish guidelines for the Regional Geologists and Core Librarian on the acceptance, storage, and abbreviation of drill core.

An inventory has been made of drill core stored in Fredericton and Sussex repositories and records are being computerized to facilitate updating. Records are to be cross-referenced by company name and by storage location. The records will include: company name, property name, NTS location, latitude and longitude, elevation, date drilled, date submitted, depth of overburden, length of hole, number of core boxes, length stored on racks, location of core, condition of core, availability and location of other data pertaining to the hole. Floor plans of repositories indicating storage locations, and base maps showing drill-hole locations are to be produced.

In 1985, the Core Librarian supervised the construction of a new core storage building at the Sussex Regional Office.

It is hoped that funds will be available for construction of storage racks to house the substantial amount of core now in temporary storage. In 1985, a few thousand metres of diamond-drill core accepted from the Canoe Landing Lake sulphide deposit was placed in temporary storage outside the Madran storage building (Figures 5 and 6).

Figure 5. Approximately 201 000 m of drill core is stored in the Madran core building. In addition, 100 000 m of core is stored temporarily on the ground outside the building.

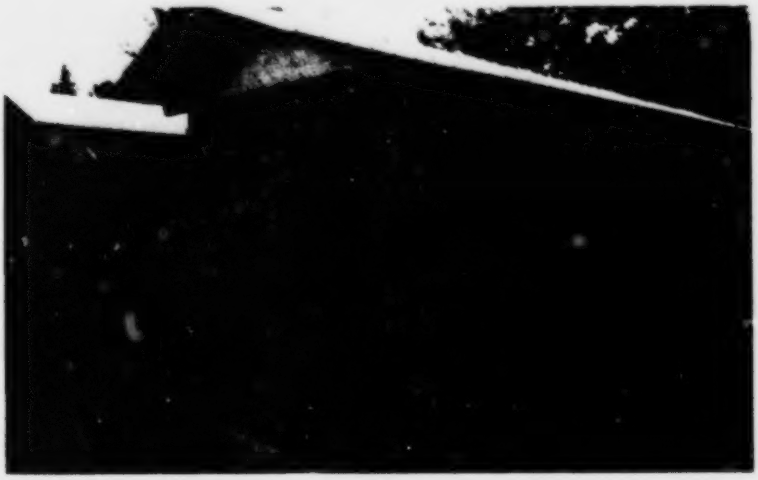

Figure 6. Drill core (23 000 m) is also temporarily stored in open-sided core racks beside the Madran core building near Bathurst.

SULPHIDE DEPOSITS STUDY: This project, which was initiated in 1984, is intended to investigate the current economic viability of important base metal deposits (Caribou, Stratmat, Restigouche, Murray Brook, Halfmile Lake, Key Anacon, Flat Landing Brook and Nine Mile Brook) in northeastern New Brunswick.

A preliminary report by R. R. Irrinki on the Stratmat zinc-lead-silver-copper deposit (Figure 3) has been completed and a report on the Key Anacon deposit is in progress. At least four more deposits are expected to be completed by 1991.

The sulphide study will include:

1. Preliminary Report: (a) history and previous ownership, (b) present ownership, (c) site description, (d) drill hole location map on a topographic base, (e) description of geology and mineralogy of the deposit, with particular emphasis on grain size and texture of the ore minerals, (f) surface plan showing the geology and distribution of metals, (g) cross and longitudinal sections showing geology and assay data, (h) estimation of in situ geological reserves with a cutoff grade of 8% Cu+Pb+Zn and 34 g/t (1 oz./ton) Ag (or equivalent), (i) available metallurgical data, (j) recommendations for future exploration in and around the deposit.

2. Mining Report: (a) mine plan showing (proposed) stopes, etc. that will enable maximum recovery from areas of established geological reserves, (b) calculation of mineable or recoverable reserves (70-90% of geological reserves), (c) estimation of dilution factor based on the mining method (10-20% of mineable reserves), (d) estimation of mining costs at different production levels and for different methods.

3. Metallurgical Report: (a) comparison of available metallurgical data on the deposit with the known metallurgy at existing mines, (b) estimation of recoveries for the metals, (c) methods to improve the recoveries, (d) estimation of processing costs, (e) recommendations.

4. Economic Viability Report This report is the final stage of the project (after 1990) that will incorporate the data from the previous three reports. It will include: (a) calculation of revenue based on current and future (10 year) metal prices, (b) estimation of capital and operating costs based on different levels of production and milling, (c) establishing a rate of return, (d) estimation of the impact of metal price changes from expected value prices, (e) recommendations.

Geoscience Data Centre[5]

The Geoscience Data Centre consisted of the following staff members in 1985: D. J. J. Carroll (Coordinator), L. G. Johnson (Cartographic Technician), R. E. Phillips (Engineering Technician), S. A. Burns (Publications Officer), and C. M. LeBlanc (Microfiche/Assessment Files Officer). The engineering technician position has been vacant since September of 1985.

PROSPECTING COURSES Under its provincial budget, the Geoscience Data Centre offered the Introductory Prospecting Course from January to March. Fifty-two people registered for the 10-session programme, which was held in three locations: Fredericton, Saint John and Moncton.

More than 330 people have registered for the Introductory Prospecting Course, which has been offered 23 times since 1981.

As in previous years, a summer field trip for these students was conducted by the Regional Geologist for southern New Brunswick, Dr. A. A. Ruitenberg. The gold occurrences at Cape Spencer and Little Dipper Harbour were selected as areas to be examined.

Under the Canada-New Brunswick Mineral Development Agreement (MDA) programme, the first Advanced Prospecting Course in New Brunswick was given. A geological consultant, Mr. A. W. Lockhart was hired to produce curriculum notes and conduct the six weekend sessions of the course. Unlike the Department's Introductory Prospecting Course, this course is primarily field related and concentrates on personal involvement in prospecting, claim staking, and follow-up geochemical and geophysical surveys.

Eighteen people registered for this initial course, which was held in the Sussex area. All participants completing the course were presented with certificates from the Hon. Malcolm N. MacLeod, Minister of Natural Resources, at the annual Review of Activities in late November.

MINERAL EXPLORATION ASSESSMENT FILES A total of 131 assessment reports were received by the Mining Recorder's office in the 1985 calender year. All reports have been microfilmed and duplicate microfiche have been distributed to the six regional libraries in New Brunswick and the two regional Geological Surveys Branch offices in Bathurst and Sussex.

Anyone wishing to purchase the New Brunswick assessment data on microfiche, either as a complete set or as selected files, may do so by contacting Precision Microfilming Services, 6100 Young Street, Halifax, N. S. B3K 2A4.

GEOSCAN The Geological Survey of Canada's computer-based bibliographic geoscience data file called GEOSCAN, was updated with the addition of more than 100 coded assessment reports and scientific publications.

As in previous years, a custom Geoscan index was specially produced for the Mineral Resources Division's annual Review of Activities, held this year in late November. This index to assessment report data listed all of the reports received in 1984 and many of those received in 1985.

AUDIOVISUAL PRODUCTS The Geoscience Information Services section maintains a library of audiovisual products related to the geological and mineral resource industry of the Province. Products, such as the 16 mm movie entitled 'The awakening giant', the 35 mm slide programmes entitled 'The mineral industries of New Brunswick' and 'The peat industry of New Brunswick', are available on a loan basis. These audiovisual materials are frequently used by staff for various talks but are used also by university personnel and school teachers in New Brunswick and the State of Maine.

Anyone wishing to borrow these products are requested to contact Geoscience Information Services in Fredericton.

In addition to the products mentioned above, we also maintain a comprehensive inventory of negative and 35 mm slide images. A cataloging system is in the development stage. These images are frequently used by Division staff, other government departments, provincial agencies concerned with education and mineral resources, and various mineral exploration and mining companies. Requests are also received from publishers of periodicals, trade journals, and newspapers.

PUBLIC AWARENESS In 1985, the Geoscience Data Centre prepared and exhibited three provincially funded displays, the first at the Annual Meeting of the Prospectors and Developers Association in Toronto in March, the second at the Tenth Annual Meeting of the Canadian Cartographic Association in Fredericton, and the third at the Mineral Resources Division's annual Review of Activities in late November.

Also this year, an MDA-funded display was produced and exhibited. This Instand Display has two main purposes: to publicize the Canada-New Brunswick Mineral Development Agreement, and to show the types and locations of Federal and Provincial geoscience surveys being conducted. The display can be updated as projects are completed and new one initiated.

The MDA display, as it is called, was first exhibited at the March Prospectors and Developers Convention in Toronto. Subsequent to that, the display was used at the 1985 GAC/MAC Joint Annual Meeting in Fredericton, the Beresford Industrial Trade Show, the lobby of the Centennial Building in Fredericton, and the annual Review of Activities of the Mineral Resources Division in late November.

PUBLICATIONS One of the major highlights for the Geoscience Data Centre and for the users of our Division's data base, was the production of a comprehensive 'List of Publications' by B. M. W. Carroll, the first since 1972. This project was completed in March, just in time for the Annual Meeting of the Prospectors and Developers Association in Toronto, and was well received there. It is the most up-to-date report on the publications available from the Geoscience Data Centre.

In 1985, the Geoscience Data Centre released forty-four map plates, five Open File Reports, three Information Circulars and one Report of Investigation. On June 10, 1985 the Department released geochemical survey data on the Cape Spencer-Black River area of southern New Brunswick.

The revenue derived from the sale of publications to private industry, the public, and government agencies amounted to $22 399 for the calendar year 1985 (Figure 7).

FEDERALLY MANAGED MDA PROGRAMMES Under the Canada-New Brunswick Mineral Development Agreement, both the Province, through the Department of Natural Resources, and the federal government through the Canada Department of Energy, Mines and Resources (EMR) can undertake projects separately or, in the case of Public Awareness Programmes, can jointly fund or participate in projects.

Some of the projects that were managed by EMR's Communications Branch, but had input from the Department of Natural Resources, included the publication of the Canada-New Brunswick Mineral Development Agreement Booklet, the brochure entitled, 'Mining in New Brunswick, Past and Present', the printing (French and English) of the Atlantic Geoscience Society's Special Publication Number 2, 'Geological Highway Map of New Brunswick and Prince Edward Island' and the production of the MDA display.

EMR personnel involved with the MDA Public Awareness Programme in 1985 included Mr. Edward Sampson (Regional Manager, Public Affairs), Mrs. Rejeanne Blais (New Brunswick MDA Coordinator) and Ms. Janice Robichaud (Assistant to Mr. E. Sampson).

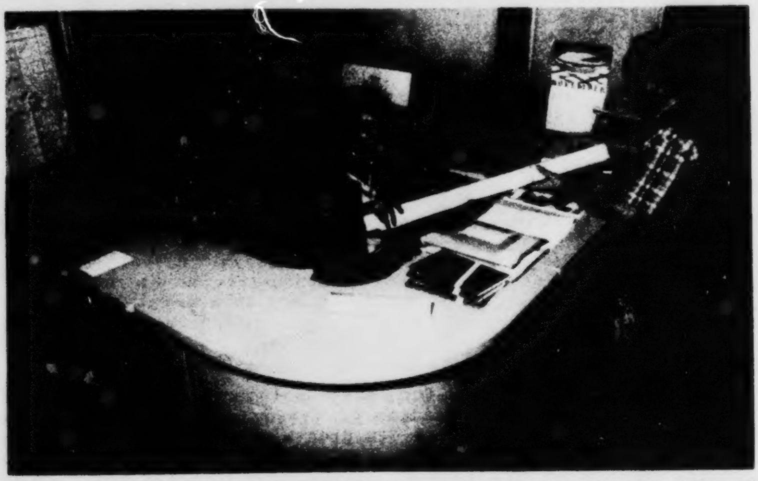

Figure 7. Susan Burns assists a customer to obtain Mineral Resources Division publications.

Geoscience Editor's Section[6]

In January of 1984, the three-member editorial committee disbanded; its duties were taken over by Barbara M. W. Carroll, who became Geoscience Editor for the Mineral Resources Division.

Assistance was provided to the Registration and Accommodation Committee of the Geological Association of Canada/Mineralogical Association of Canada Joint Annual Meeting. The meeting, which was hosted by the University of New Brunswick Geology Department, had 857 registrants from many countries (Figure 8). In addition to the presentation of papers, field trips were given in New Brunswick, Nova Scotia, Prince Edward Island and Newfoundland, and a short course and workshops were conducted.

In the fall of 1985, Shasta A. Abbott was hired as Assistant Geoscience Editor. This is a term position under the Canada-New Brunswick Mineral Development Agreement that was instituted in anticipation of an increased workload due to MDA project reports and maps.

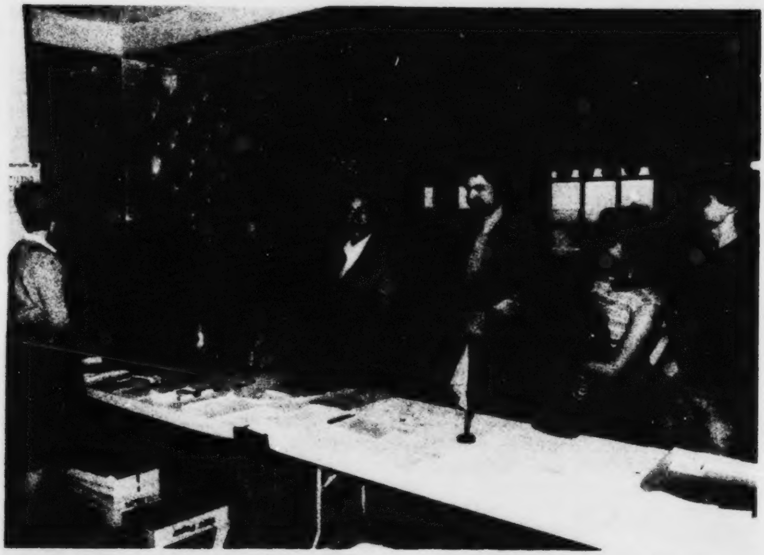

Figure 8. Registration for the Geological Association of Canada/Mineralogical Association of Canada Joint Annual Meeting was held on the University of New Brunswick campus.

MINERAL DEVELOPMENT BRANCH[7]

The Mineral Development Branch is composed of the Director's office and seven sectors: Mineral Development, Mineral Process Engineering, Mine Engineering, Administration, Mineral Lands, Mine Taxation and Statistics, and Word Processing (Figure 1c). The Director is G. J. Greer.

The Mineral Development Branch's overall goals are to ensure that mineral deposits are developed at the optimum rate consistent with long-term income and employment objectives, to enhance the viability of marginally economic mineral deposits, to ensure that inactive mining operations are rehabilitated to a state that would avoid on-going costs to the public and, where possible can be economically productive in other uses, to ensure the highest degree of in-province processing, and to maximize recovery, both in the mining and primary processing stages.

The Mineral Development Branch administers the Bituminous Shale Act, the Metallic Minerals Tax Act, the Mining Act, the Oil and Natural Gas Act, the Ownership of Minerals Act, the Pipe Line Act, the Quarriable Substances Act, and the Underground Storage Act. Copies of all Acts and associated Regulations are available from the Queen's Printer, Province of New Brunswick, P. O. Box 6000, Fredericton, N. B. E3B 5H1. The telephone number is (506) 453-2520.

(**NOTE:** The regulation pertaining to worker safety in the mineral industry is administered by the New Brunswick Occupational Health and Safety Commission.)

RECLAMATION Five reclamation plans were received and accepted in 1985, including one shut-down plan. There were also two notifications of trenching programmes submitted by companies carrying out exploration work in the Province.

Reclamation work, involving grading, topsoil placement and hydroseeding of 6.2 ha of mined land, was carried out at two mine sites in northern New Brunswick during the year. As well, approximately 142 ha of mined lands were contoured in the Minto-Chipman coal mining region and 20 ha of contoured land was seeded in the Eighteen Brook and Heath mine areas.

A report detailing the information obtained from the 1984 inventory survey conducted on the pre-1977 mined lands in the Minto-Chipman area was completed during 1985.

Mineral Development Sector[8]

The staff of the Mineral Development Sector includes Donald Barnett (Manager), Clinton St. Peter (Geologist, oil shales), Ronald Shaw (Geologist, peat and coal) and A. Thomas Martel (Geologist, oil and natural gas), Timothy Webb (Geologist, industrial minerals), Jacques Thibault (Geologist, Quaternary and coastal zone), Allen Seaman (Geologist, Quaternary) and Paul O'Leary (Engineering Technician, quarriable substances). In September, R. E. Phillips (Engineering Technician) took on the responsibility for oil and natural gas and pipeline inspections.

PIPELINE AND UNDERGROUND STORAGE[8] Two pipeline corridor routes that were proposed by Mobil Oil Canada Ltd. and Sable Gas Systems for transportation of natural gas from the 'Venture Field' off Nova Scotia and reviewed in 1984, have been delayed pending a decision on the economic viability of the Venture field. Several company liaison meetings were held in 1985.

Draft regulations under the Pipe Line Act were prepared in 1985 and are expected to be finalized in 1986.

OIL SHALES[9] The Branch tendered an oil shale assessment study under the current Federal-Provincial Mineral Development Agreement. The contract was awarded to K. D. A. Whaley of Fredericton, who successfully drilled 908 m of NQ core in the Rosevale area of Albert County (Figure 9). The core has been lithologically logged and 505 samples of the core were discharged for organic geochemical and carbonate analyses. The six boreholes in this project were geophysically logged by Century Geophysical Corporation who provided caliper, natural gamma, resistivity, apparent density and neutron-neutron porosity logs.

A compilation of all borehole data on oil shales, oil and gas, coal and a number of other commodities in southern and eastern New Brunswick was initiated in 1985. The data will be available in the form of computer printout and bound copy when completed.

The Branch, in conjunction with the Geology Department of the University of New Brunswick, prepared a field trip guidebook for the GAC/MAC Joint Annual Meeting. The field excursion was conducted in the Moncton Subbasin in May, 1985 by R. Pickerill, D. Carter and C. St. Peter.

A field trip guidebook on the "Oil shales of the Albert Formation at Frederick Brook in southeastern New Brunswick" was prepared for the Geological Society of America as part of its Decade of North American Geology (DNAG) project.

In 1985, the Mineral Development Branch continued to work cooperatively with the Department of Commerce and Technology and the New Brunswick Electric Power Commission with respect to providing oil shale resource data necessary for the $33 000 000 conversion of the Chatham Thermal Generating Station. The plant will be retrofitted with a circulating fluidized bed combustor to utilize oil shales for the removal of SO_x gases from New Brunswick's high-sulphur coal. The combustor is scheduled for start-up in the summer or early fall of 1986 and will be operated for about 3000 hours during which 40 000 to 50 000 t of oil shale will be consumed.

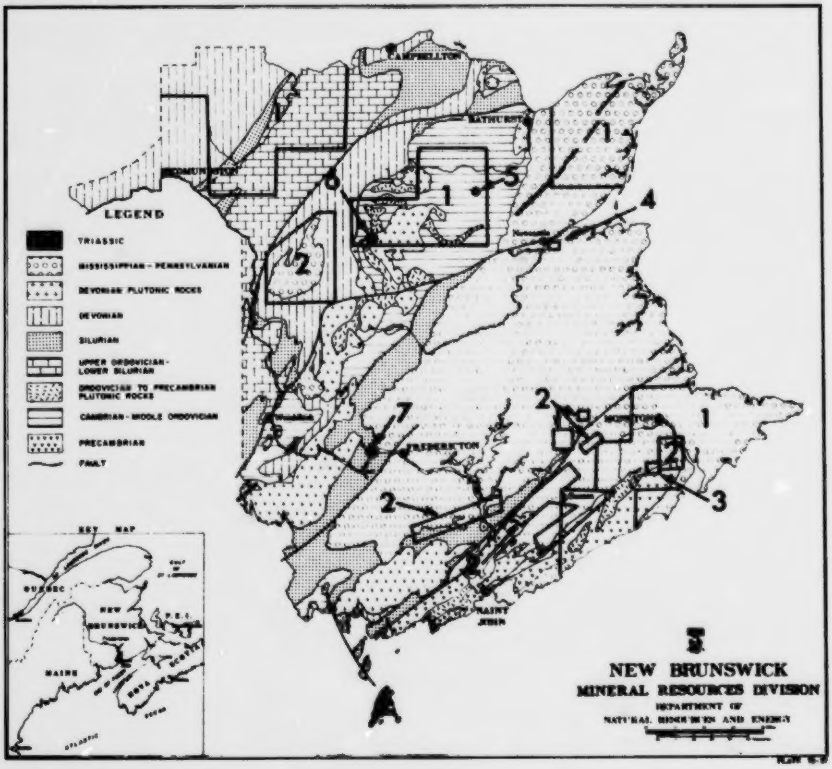
CAMPBELLTON
BATHURST
EDMUNDSTON
FREDERICTON
MONCTON
SAINT JOHN
LEGEND
TRIASSIC
MISSISSIPPIAN - PENNSYLVANIAN
DEVONIAN PLUTONIC ROCKS
DEVONIAN
SILURIAN
UPPER ORDOVICIAN-LOWER SILURIAN
ORDOVICIAN TO PRECAMBRIAN PLUTONIC ROCKS
CAMBRIAN - MIDDLE ORDOVICIAN
PRECAMBRIAN
FAULT
KEY MAP
QUEBEC
NEW BRUNSWICK
P.E.I.
MAINE
NOVA SCOTIA
NEW BRUNSWICK
MINERAL RESOURCES DIVISION
DEPARTMENT OF NATURAL RESOURCES AND ENERGY
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Figure 9. Areas in which Mineral Development Branch projects were conducted in 1985: (1) granular aggregate resource studies; (2) limestone investigations; (3) Albert oil shale assessment; (4) coal-oil shale combustion research; (5) Heath Steele mine study; (6) Miramichi earthquake study; and (7) Mactaquac Headpond project.

COAL[10] The Branch continued to participate on various committees charged with duties from determining the beneficiation potential of eastern Canadian coals to recommending direction for Canadian coal research and development.

OIL AND NATURAL GAS[11] The field work for the in-house study of seismic data in the Cumberland Subbasin was completed and the report was in preparation.

A detailed study of the bitumen showings in the Province was completed in 1985.

The Escuminac Formation study, which assessed the potential of the formation for hydrocarbon generation and entrapment, was completed.

AGGREGATE RESOURCE INVENTORY[12] The accelerated programme of aggregate resource mapping and evaluation continued in 1985. Reconnaissance-level mapping at a scale of 1:50 000 was completed by in-house staff for the Connors (21 N/2), Estcourt (21 N/6), and Lac-Baker (21 N/7) map areas of northwestern New Brunswick, and the Tabusintac River (21 P/6), Wishart Point (21 P/7), Tracadie (21 P/10), Burnsville (21 P/11), Grand-Anse (21 P/14), and Caraquet (21 P/15) map areas in northeastern New Brunswick. In southeastern New Brunswick, the Cape Tormentine (11 L/4), Petitcodiac (21 H/14E), Hillsborough (21 H/15), Amherst (21 H/16), Port Elgin (21 I/1) and Moncton (21 I/2) map areas were completed. Mapping was also begun in the Salmon River (21 H/6) and Waterford (21 H/11) map areas (Figures 9 and 10).

The above work was supplemented by two contracts awarded under the Canada-New Brunswick Mineral Development Agreement. Terrain Analysis and Mapping Services Ltd. mapped the Big Bald Mountain (21 O/1), Serpentine Lake (21 O/2), and California Lake (21 O/8) map areas of north-central New Brunswick. Gartner Lee Associates Ltd. in association with Three-D Geoconsultants Ltd. mapped the Wild Goose Lake (21 N/16), Grand River (21 O/5), Kedgwick (21 O/11), Gounamitz River (21 O/12), States Brook (21 O/13), and Menneval (21 O/14) map areas in the northwest (Figure 10).

LIMESTONE[13] A detailed study involving a reexamination and reassessment of the Province's limestone resources and a synopsis of various aspects related to the limestone industry continued in 1985 (Figure 9).

In New Brunswick, the majority of our better quality limestones and dolomites are found principally in rocks of Precambrian, Silurian and Mississippian age, although a few occurrences have been recently noted in Ordovician rocks as well. To date, field reconnaissance involving mapping and sampling of more than 500 occurrences has been completed and data compilation on individual deposits has been accelerated.

PEAT[14] Applications continued to be received for Peatland Exploration Licences. Most recent interest has been shown for peatlands located in Kent County.

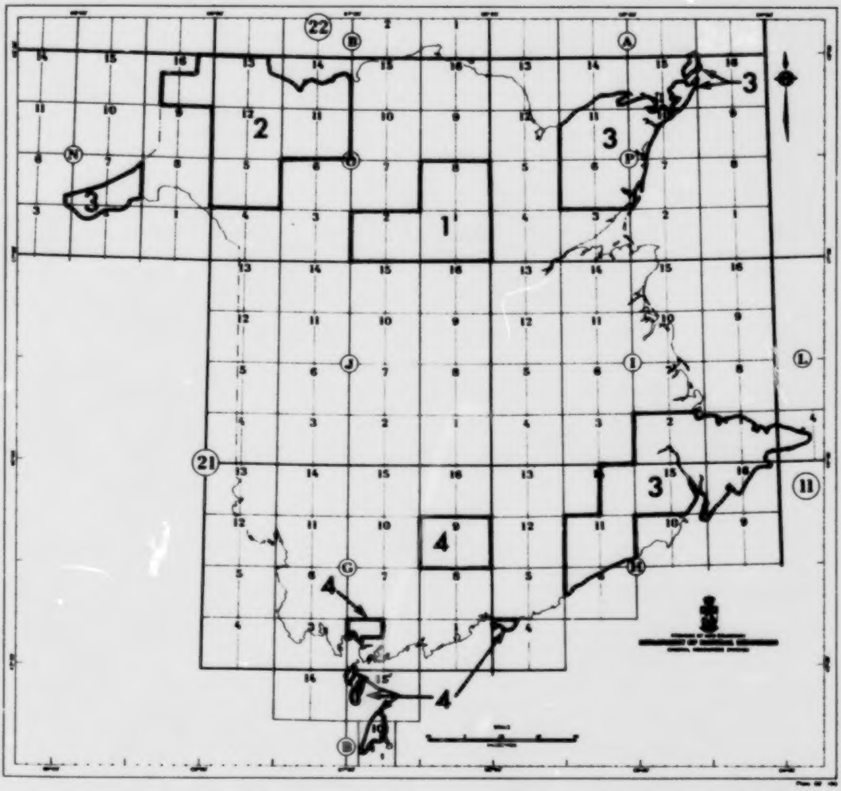


Figure 10. Aggregate resource mapping in New Brunswick in 1985: (1) Terrain Analysis and Mapping Services Ltd., contract; (2) Gartner Lee Associates Ltd. in association with Three-D Geoconsultants Ltd., contract; (3) Mineral Development Branch staff; (4) areas to be mapped in 1986. All other areas in the Province have been mapped.

The Branch continued to support efforts to promote an industry-oriented peat research centre established in Shippagan and affiliated with Centre Universitaire de Shippagan. The Centre is expected to be open in May of 1986.

CROWN AGGREGATE MANAGEMENT[15] Management of aggregate resources on Crown lands and designated areas continued under the Quarriable Substance Act.

A total of 328 quarry permits were issued during the year, representing an increase of 3% over the previous year. Quarry leases in effect in 1985 included those to Brunswick Mining and Smelting Corporation Limited, Elmtree Resources Ltd., Dundee Cement Products Ltd., Brunswick Ready Mix Concrete Ltd., and Heath Steele Mines Ltd., covering a total area of 481 ha.

Quarry permit and lease sites were inspected during the year to ensure that regulations under each were adhered to. A total of 3 000 000 t of sand, gravel and stone were removed compared to 2 260 000 t in 1984.

Mineral Process Engineering Sector[16]

The overall goal of the Mineral Process Engineering Sector is to evaluate emerging technologies and processes, to liaise with industry and to recommend to the Province various ways in which it can be of assistance to industry in mineral research and development work. The department has been providing a technical assistance to industry and reviewing possible extraction methods for undeveloped ores under the supervision of Mr. Dean Thibault, Process Engineer.

Mineral processing investigations are being carried out using bench-scale testing methods to review techniques of improving process grade-recovery relationships and to identify alternative processing methods. Investigations include in-plant controlled testing and development of metal extraction methods. Various projects are presently being carried out under the Federal-Provincial Mineral Development Agreement (MDA) complying with the interest of the provincial mining industry concerning antimony, precious metals, specialty metals (such as gallium, germanium, rare earths, indium, magnesium, lithium, and zirconium), zinc ores, tin, tungsten, graphite, titanium, and beryllium ores. Also under the MDA, various projects concerned with improving extraction technologies of complex sulphides and manganese ores have been contracted.

Mine Engineering Sector[17]

The Mine Engineering Sector is responsible for the inspection and evaluation of mining plans, for carrying out economic analyses and compiling mining statistics, and for administering certain portions of the Mineral Development Agreement. The following activities were carried out in 1985 under the supervision of the Mining Engineer, J. J. Chandra.

ECONOMIC STUDIES The fall in metal prices and lower world consumption patterns have created major problems for the mining industry as a whole. New Brunswick was not spared the effects of this decline, which resulted in the closing of two mines in New Brunswick, Heath Steele mine and Mount Pleasant tungsten mine. In addition, the possibility of having a zinc smelter in New Brunswick becomes more remote. Metal consumption has fallen worldwide when compared to the growth rate of Growth Domestic Product in most countries. To compound the problem, the Metals Mining Deflator Index has risen more than 300% since 1971. A miner's dollar in 1972 would require over $4.00 in 1985. As a result, project financing has become very critical and it would appear that capital intensive mega-projects are a thing of the past. How we recover from this dilemma is a challenge both to industry and to the government.

(1) Heath Steele Mine: A task force on Heath Steele mine was authorized by the Premier on request by the United Steel Workers Union. Its mandate was to investigate the feasibility of reopening the mine and to determine the contributions, by the government, the union and Noranda Inc., which would make this possible. The task force met four times and concluded that the cost of reopening was too high when compared to the benefits it would provide to workers and to the Province as a whole. The Department of Natural Resources will continue to monitor the situation and will cooperate with Heath Steele Mines Ltd. on a joint mapping programme of the B Zone.

An in-house economic analysis of the Heath Steele mine was also completed (Figure 9). This study looked at the history of the mine, its production and financial performance and the feasibility of future operation. As part of this study, detailed analyses of the future of zinc, copper, lead, silver and gold were undertaken. Copies of the metal reviews can be obtained from the Mining Engineer.

(2) Zinc Smelter Study: An economic feasibility study on a proposed New Brunswick zinc smelter has been completed. This study was done jointly with the Department of Commerce and Development under an interdepartmental committee made up of D. Gemmell, E. Jagoe, G. Greer and J. Chandra. The interdepartmental committee's recommendations have been submitted to the Deputy Minister.

(3) Mount Pleasant Tungsten Mine: An economic analysis of the Mount Pleasant tungsten mine has also been completed. World tungsten and molybdenum prices are the two main factors contributing to the demise of this joint venture between Billiton Canada Ltd. and Brunswick Tin Mines Ltd. There is still major potential in the Mount Pleasant region, in particular relating to the tin orebodies at the North Zone deposit. In addition, the Mount Pleasant caldera complex is still not fully explored and there is every indication that other deposits may be found nearby.

As part of this study, detailed analyses of the future of tungsten, tin and molybdenum were undertaken. Copies of the metal reviews can be obtained from the Mining Engineer.

(4) New Brunswick Mineral Production Statistics 1899-1985: Mineral production data for the period 1899-1985, which have been prepared as an Open File Report, is nearing completion. This document contains listings of annual production figures for metals, nonmetals, fuels and structural materials. Included are graphic plots for each commodity. Value statistics ($) are provided both in current and constant 1985 Canadian dollars.

(5) Mineral-based Manufacturing Opportunities in New Brunswick: The basic metallic and nonmetallic minerals produced in New Brunswick have many uses. The purpose of this report is to: (a) identify the metals, minerals and rocks currently produced in New Brunswick and those with potential for production, (b) identify the basic saleable forms of each metal, mineral or rock produced with approximate percentages, (c) outline the various uses for each basic form, and (d) outline possible mineral-based manufacturing opportunities for the various forms of the basic metallic and nonmetallic mineral resources produced in New Brunswick. This Open File Report is nearing completion.

ENGINEERING STUDIES The following engineering studies were carried out in 1985.

(1) Miramichi Earthquake Studies: A cooperative study, undertaken at the Indian Lake site (Figure 9) in 1983-1984 by the Canada Department of Energy, Mines and Resources (EMR), the New Brunswick Department of Natural Resources (DNR), and Ontario Hydro was completed in 1985. This study involved the measurement of regional and local stress by the over-coring method. Results of the study are contained in a report entitled 'In situ stress pilot project-Miramichi epicentral area' published by Ontario Hydro (Report No. 85-185-K).

Aftershock activity at the Miramichi site is still being monitored by EMR. The frequency of aftershock is diminishing as shown in Figure 11.

(2) Salt Backfill in Potash Mines: This project is funded under the Canada-New Brunswick Mineral Development Subsidiary Agreement. New Brunswick mines are required to place waste salt in mined-out openings to reduce storage on surface. If properly stowed, backfill will reduce absolute convergence and improve stability of adjacent mine openings. However, the beneficial effect of backfill on mine stability is only partially known. Therefore, field and laboratory investigations in connection with numerical modelling are required to quantify the beneficial effect of backfilling on mine stability.

A Requisition For Services (RFS) was put out by the Federal Department of Supply and Services on May 1, 1985 for this project. The statement of required work is as follows:

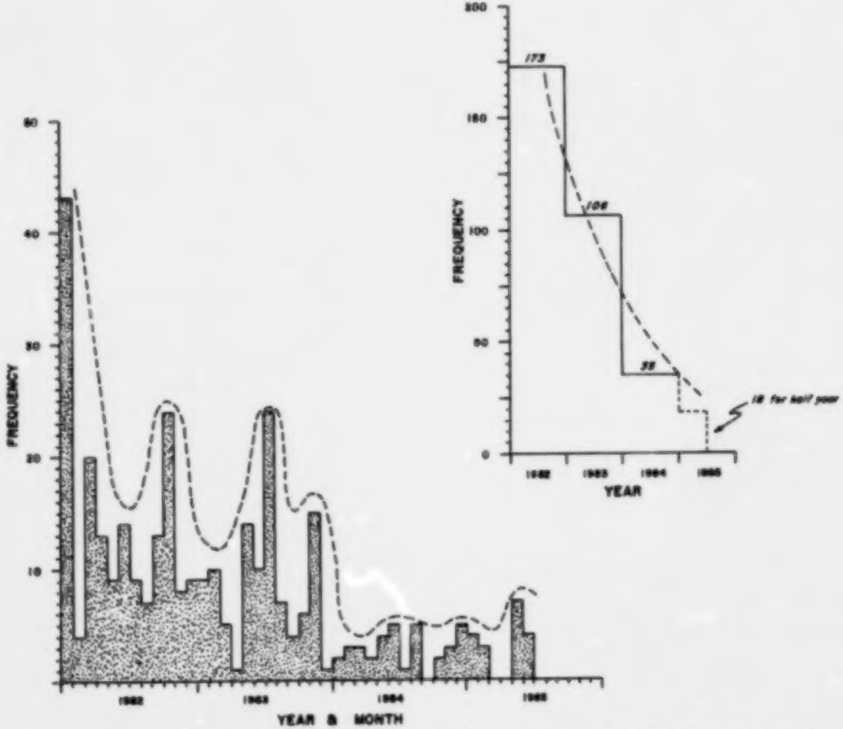


Figure 11. Aftershock sequence of the January 9, 1982 Miramichi earthquake in central New Brunswick.

(a) Determine the strength and deformation properties for waste salt as backfill under steady state creep conditions. The load range and rate should cover the compression expected from wall pressures due to excavation convergence.

(b) Carry out field tests to identify convergence rate and magnitude of relevant mine openings to verify the criteria under (a).

(c) Determine potential packing densities of waste back fill achieved by various types of stowing.

(d) Determine the engineering properties of the materials in roof, floor and pillars required for numerical or mathematical modelling as required in item (e).

(e) Carry out a numerical or mathematical analysis to show the stabilizing effect of backfill on single openings in evaporite strata of relevant mining depth in New Brunswick.

(f) The analysis performed should have the potential to be expanded to multiple openings or model a complete mining lay out. This work may be authorized as an optional item to this contract.

(g) Outline the scope, schedule and funding requirements of a field demonstration to prove the stabilizing effect of waste salt backfill (reduced absolute convergence and convergence rates). The anticipated effort for such a field demonstration could include an instrumented backfilled room which would be observed for a period of one year.

Responses to this RFS were appraised by EMR and DNR and, by mutual consent, a contract was let to the joint group of Mraz Project Consultants Ltd. and University of Waterloo. The project work is being undertaken at the Denison-Potacan Potash Company mine at Sussex. Work began in the latter part of 1985, and is being monitored by EMR and DNR.

(3) Mactaquac Head Pond Project: This project was undertaken with the assistance of Drs. R. Yazdani and E. Derenyi of the University of New Brunswick Department of Surveying Engineering. Analysis of gravimetric, geodetic and thematic data (Earth Resources Technology Satellite images) of the Mactaquac Head Pond area (Figure 9) is being undertaken to locate all structural features in the region that may be causative of rock creep and local uplift.

SPONSORED STUDIES Two studies have been sponsored at the University of New Brunswick to allow students to research subjects related to the mining industry. These studies, which could be used as course or thesis material, would also be of value to the Mineral Resources Division.

(1) 'Economic heavy minerals in selected placer deposits of New Brunswick' (A geologic and mineral resource utilization appraisal.) Supervisors are E. Hale and J. Chandra.

The objectives of the project are to establish the nature of heavy mineral occurrences in the Province and their constituent makeup, and to establish the feasibility of fitting the said deposits into various exploitation models. Base exploitation system/models will be evaluated with flowsheet descriptions and marketing and economic impact considerations.

(2) 'Preliminary assessment of the use of colour infrared aerial photography for monitoring environmental effects of strip mining, Minto area, New Brunswick.' Supervisors are S. Oliver and J. Chandra. This project attempts to test the detectability of environmental impacts of strip mining in the Minto-Chipman area. Hand-held colour infrared and low altitude oblique aerial infrared photographs will be acquired over selected sites and analyzed for recognition patterns relating to acidity in ponds and to vegetative growth rates.

Administration Section[18]

The Administration Section was staffed in 1985 by Sandy Devenney (Administrative Services Officer) and Shelley Stephens (Receptionist).

The provincial budget for the Mineral Resources Division for fiscal year 1985-86 was $2 003 186 (Table 1), which represented a 3.9% reduction over the previous year (Figure 12). The 1985-86 budget was divided into two programmes: (a) Minerals Management, and (b) Departmental Support Services.

Table 1.
Provincial Budget 1985-86

Minerals Management

	Primary	Budget	Expenditures	Differences (over) or under
Salaries	3	$1 277 427	$1 259 852.53	$17 574.47
Services	4	364 682	345 123.97	19 558.03
Materials	5	131 215	86 471.01	44 743.99
Equipment	6	14 796	72 329.66	(57 533.66)
Contributions	7	2 500	2 500.00	--
		1 790 620	1 766 277.17	24 342.83

Departmental Support Services

	Primary	Budget	Expenditures	Differences (over) or under
Salaries	3	$154 150	$158 262.48	$(4 112.48)
Services	4	42 725	40 183.76	2 541.24
Materials	5	8 450	10 516.53	(2 066.53)
Equipment	6	7 241	5 960.48	1 280.52
		212 566	214 923.25	(2 357.25)

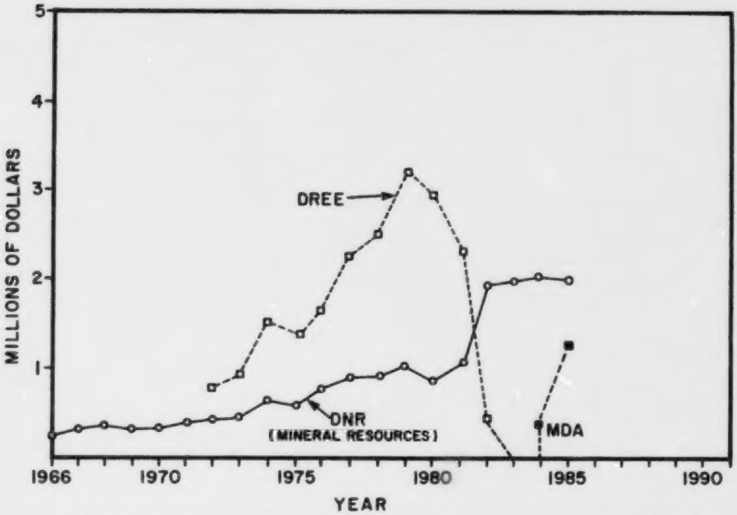


Figure 12. Budget of Mineral Resources Division, 1966-1985.

Details of staffing for the Mineral Resources Division are given in Figures 1a, 1b, 1c and Table 2. Table 3 represents a historical review of expenditures, staff and revenue.

The Mineral Development Agreement budget for fiscal year 1985-86 was $1 165 500. Expenditures amounted to $1 048 295.17, leaving a balance of $117 204.83.

In 1985, six geologists were on staff under term contracts: S. E. Watters, M. J. McLeod, A. T. Pronk, H. E. MacLellan, S. A. Abbott, and G. Philpott.

Mineral Lands Section[19]

The Mineral Lands Section processes and maintains records pertaining to the disposition of Crown-owned minerals rights. Mining claims are recorded and prospecting licences are sold in Fredericton and at the Regional Offices in Bathurst and Sussex.

The Mineral Lands staff in 1985 consisted of D. D. W. Bailey (Chief Mining Recorder), E. V. Jackson (Deputy Recorder), and Fred Edney (Draftsman).

Table 4 presents mineral lands statistics for 1985. The number of claims staked in each of the metallogenic zones is illustrated in Figure 13 and the total annual expenditures reported for assessment credit (1954-1985) are given in Figure 14.

Table 2.
Staff of Mineral Resources Division 1960-1985

Year	Mines or Mineral Development						Mineral Resources or Geological Surveys						Total Division
	Admin	Geologist Mining Eng	Tech	Steno Secty	Draft	Total	Admin	Geologist Mining Eng	Tech	Steno Secty	Draft	Total	
1960-61	5	1	3	10	1	20	INCLUDES MINERAL LANDS						20
1961-62	5	1	2	10	2	20							20
1962-63	5	1	2	11	2	21							21
1963-64	5	1	2	10	2	20							20
1964-65	5	2	2	9	2	20							20
1965-66	5	6	3	8	2	24							24
1966-67	5	8	3	8	2	26							26
1967-68	2	-	3	-	-	5	3	9	1	7	2	22	27
1968-69	2	-	3	-	-	5	3	10	1	7	2	23	28
1969-70	2	-	3	-	-	5	3	7	1	6	3	20	25
1970-71	3	-	2	-	-	5	3	7	4	5	3	22	27
1971-72	3	-	2	-	-	5	3	7	4	5	3	22	27
1972-73	3	-	3	-	-	6	3	8	4	5	3	23	29
1973-74	3	-	3	-	-	6	3	8	4	5	3	23	29
1974-75	3	-	3	-	-	6	4	8	3	6	3	24	30
1975-76	3	-	4	-	-	7	4	8	2	6	3	23	30
1976-77	3	-	4	-	-	7	4	8	2	6	3	23	30
1977-78	4	-	6	-	-	10	2	8	2	4	3	19	29
1978-79	2	-	5	-	-	7	4	9	3	5	3	24	31
1979-80	-	-	-	-	-	-	4	13	6	8	3	34	34
1980-81	-	-	-	-	-	-	8	13	6	8	3	38	38
1981-82	2	6	1	1	-	10	6	8	7	6	2	29	39
1982-83	5	8	1	3	1	18	5	9	6	4	1	25	43
1983-84	6	8	3	5	2	24	6	8	4	1	-	19	43
1984-85	6	10	1	3	1	21	5	10	6	1	1	23	44
1985-86	5	10	2	4	1	22	5	16	5	1	1	28	50

Table 3.
Mineral Resources Division
Budgeted Amounts, Revenue, Staff
1967-1985

Year	Budget Provincial ($)	Expenditures Provincial ($)	Federal/ Provincial Agreement Budget ($)	Federal/ Provincial Agreement Expenditures ($)	Total Revenue ($)	Staff		
						Permanent	Casual	Total
1967-68	381 478	381 478	-	-	278 464	27	-	27
1968-69	341 671	341 671	-	-	292 257	28	-	28
1969-70	321 162	321 162	-	-	417 949	25	-	25
1970-71	626 289	626 289	-	-	319 278	27	13	40
1971-72	798 274	798 274	-	-	303 0302	29	13	42
1972-73	904 673	904 673	-	-	233 525	29	13	42
1973-74	1 527 020	1 527 020	-	-	592 550	29	13	42
1974-75	1 384 312	1 384 312	-	-	2 165 711	30	13	43
1975-76	1 354 593	1 354 593	-	-	2 561 458	30	13	43
1976-77	1 041 180	1 041 180	1 054 678	798 685	863 888	30	13	43
1977-78	972 122	972 122	2 814 775	2 004 378	1 135 828	29	14	43
1978-79	1 065 817	1 065 817	2 529 298	2 167 641	3 040 492	31	12	43
1979-80	957 996	957 996	1 705 158	1 492 199	10 736 752	36	12	48
1980-81	967 895	967 895	1 504 388	1 239 714	8 127 201	38	10	48
1981-82	1 164 651	1 164 651	1 877 815	1 368 202	7 807 912	39	10	49
1982-83	1 926 022	1 926 022	475 224	434 089	5 553 900	43	4	47
1983-84	2 041 300	2 028 442	26 024	26 024	5 175 989	44	3	47
1984-85	2 083 396	1 956 891	331 000	78 549	7 160 921	44	3	47
1985-86(P)	2 003 186	1 981 200	1 165 500	1 048 295	5 207 462	47	3	50

(P) indicates preliminary estimates.

Table 4
Mineral Lands Statistics, 1985

	No.	Claim Equivalent	Hectares	% Inc. Over Prev. Year (Decrease)
Prospecting Licences Sold	332	-	-	(1.8)
Claims Recorded	5 070	-	81 280	87.9
Claims Renewed	4 116	-	65 856	(17.5)
Claims Expired	3 399	-	54 384	(39.3)
Claims in Effect	9 196	-	147 136	19.5
Mining Licences Issued	14	297	4 752	(38.1)
Mining Licences Renewed	139	11 070	177 120	.8
Mining Licences Expired	19	396	6 336	27.7
Mining Licences in Effect	153	5 549	88 784	(1.8)
Coal Licence in Effect	1	5 818	93 088	0
Potash Leases in Effect	3	2 355	38 130	35.8
Other Leases in Effect	4	437	7 106	9.2
Total Claims and Claim Equivalents in Effect	-	23 355	373 680	9.7
Oil-Gas Licences	50	-	1 254 148	(4.9)
Oil-Gas Leases	1	-	2 156	0
Bituminous Shale Licence	1	-	8 998	100.0
Bituminous Shale Development Permit	1	-	1 439	-
Bituminous Shale Leases	-	-	-	-
Underground Storage Licences	-	-	-	-
Underground Storage Leases	-	-	-	-
Quarry Permits	317	-	127	4.0
Quarry Leases	8	-	494.25	2.6
Peat Licences	1	-	150	(85.0)
Peat Licences	1	-	150	(85.0)
Peat Leases	24	-	9 064.5	-
Potash Exploration Reservation	0	-	-	(100.0)
	No.	Depth (m)	Expenditures ($)	
Assessment Reports Submitted	119			4.4
Value of Assessment Reports Received			3 078 877	47.3
Total Drilling (Metres)		18 970		27.0
Drilling Value			969 186	25.7
No. of Holes	114			0.0
Potash Exploration			0	
No. of Holes	0			
Total Depth		-		
Oil-Gas Exploration			Not Avail.	
No. of Holes	4			
Total Depth		7 655		
Bituminous Shale Exploration			80 000	
Number of Holes	6			
Total Depth		928		

In the late fall of 1985, the project of entering mineral claims data into the Wang Alliance System was begun. This system provides a method of storage and retrieval of mineral claims information. All new claims data will be entered into the Alliance System (Figure 15).

Mine Taxation and Statistics[20]

The Mine Assessor, W. R. Carr, received monthly statistical reports on production, manpower, shipments, etc. from the active mines in the Province. This information, as well as commodity prices, U. S. exchange rates, forecasted captial expenditures, etc., were compiled into a statistical summary report and distributed monthly.

The tax returns for those mines subject to the Metallic Minerals Tax Act were reviewed and collection of revenue continued on a routine basis. Potash and coal royalties were collected on a regular basis. Revision of the Metallic Minerals Tax Act continued.

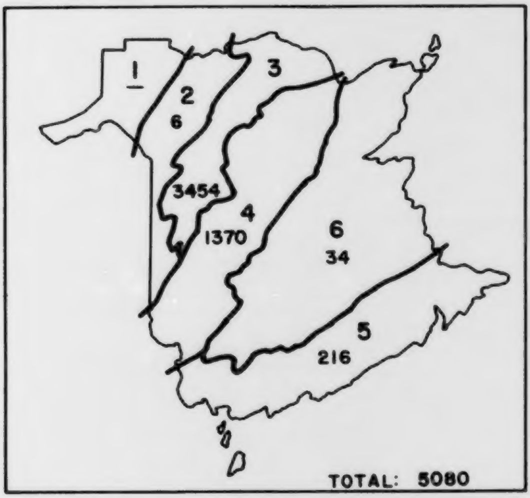


Figure 13. Number of claims stakes by metallogenic region in 1985.

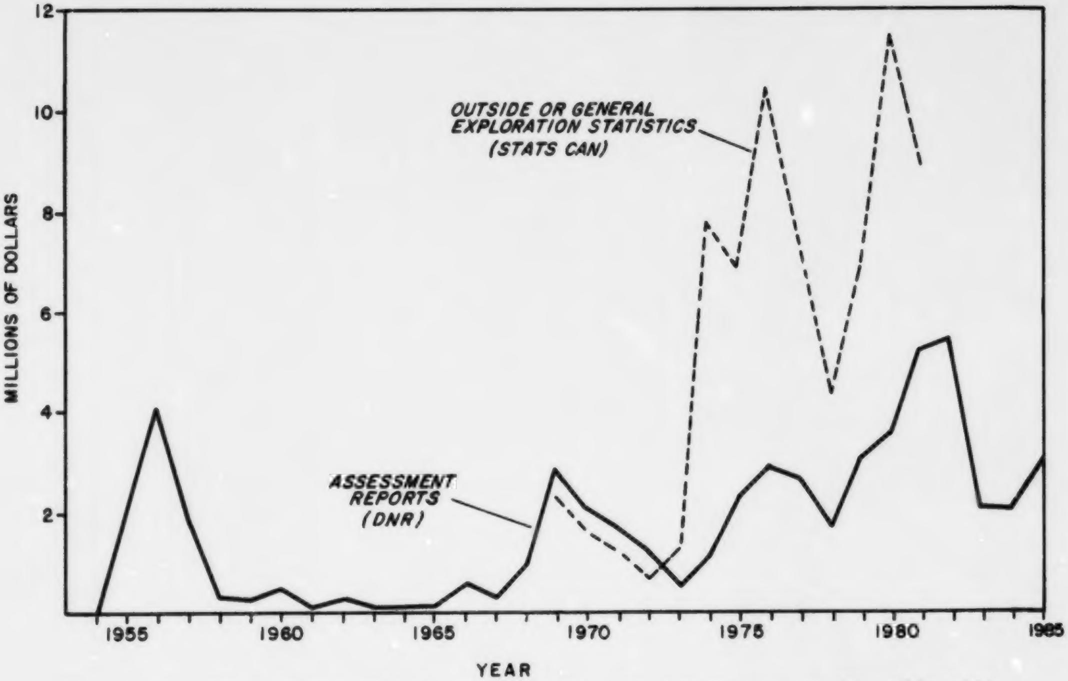


Figure 14. Total annual expenditures reported for assessment credit, 1954-1985.

Figure 15. Fred Edney and Douglas Bailey discuss the entry of claims data into the Alliance System.

MINING COMMISSIONER'S REPORT[21]

Only one dispute was brought to the attention of the Mining Commissioner, W. I. Spence, for resolution during the calendar year 1985.

Merton Stewart vs. John Leslie: A staking dispute, involving the use of witness posts. A decision was given on August 9.

MINERAL RESOURCES DIVISION PUBLICATIONS

REPORTS AND ABSTRACTS

Abbott, S. A. (editor) 1985. Tenth annual Review of Activities, project resumés, 1985. New Brunswick Department of Forests, Mines and Energy, Mineral Resources Division, Information Circular 85-3, 80 p.

Barr, S. and Fyffe, L. R. 1985. Petrochemistry and tectonic setting of some Carboniferous volcanic rocks in New Brunswick (abstract). Atlantic Geoscience Society Symposium on Tectonic Models for the Evolution of the Appalachian Region, Wolfville, Nova Scotia. Program with Abstracts.

Barua, S., Sy, O., Salib, P. F. and Abbott, D. 1985. Demonstration of an integrated oil shale retort system, Interim report No. 1. New Brunswick Department of Natural Resources, Mineral Resources Division, Open File Report 85-1, 83 p.

Carroll, B. M. W. 1985. List of publications available from New Brunswick Department of Natural Resources, Mineral Resources Division. New Brunswick Department of Natural Resources, Mineral Resources Division, Information Circular 85-1, 375 p.

Carroll, B. M. W. (editor) 1985. New Brunswick's mineral industry, 1984. New Brunswick Department of Forests, Mines and Energy, Mineral Resources Division, Information Circular 85-2, 136 p.

Chandra, J. J. 1985. Geothermal heat potential of the central Carboniferous Basin, New Brunswick. Institute of Sedimentology and Petroleum Geology. Proceedings of the Geothermal Energy from Sedimentary Basins Conference, Calgary, Alberta.

Chandra, J. J., Yazdani, R. and Derenyi, E. 1985. Assessment of data enhancement techniques in the mapping of linear structures. A case study in southern New Brunswick, Canada (using the Dipex Aries II System). Proceedings of the International Symposium on Remote Sensing the Environment, Fourth Thematic Conference, San Francisco, California.

Davies, J. L. 1985. Stratabound base metal sulphide deposits of northern New Brunswick, Canada (abstract). Geological Association of Canada/Mineralogical Association of Canada Joint Annual Meeting, Fredericton, New Brunswick. Program with Abstracts, Volume 10, p. A13.

Davies, J. L. 1985. Massive sulphide deposits of the Bathurst-Newcastle area, New Brunswick, Canada. Geological Association of Canada/Mineralogical Association of Canada Joint Annual Meeting, Fredericton, New Brunswick. Field Excursion 2, 73 p.

Ferguson, L. and Fyffe, L. R. 1985. Geological highway map of New Brunswick and Prince Edward Island. Atlantic Geoscience Society, Special Publication Number 2.

Fyffe, L. R. 1985. Stratigraphy and tectonic setting of Ordovician rocks of northeastern New Brunswick (abstract). Geological Association of Canada/Mineralogical Association of Canada Joint Annual Meeting, Fredericton, New Brunswick. Program with Abstracts, Volume 10, p. A19.

Fyffe, L. R. and Barr, S. M. In press. Petrochemistry and tectonic significance of Carboniferous volcanic rocks in New Brunswick. Canadian Journal of Earth Sciences.

Fyffe, L. R. and Noble, J. P. A. 1985. Stratigraphy and structure of the Ordovician, Silurian and Devonian of northern New Brunswick. Geological Association of Canada/Mineralogical Association of Canada Joint Annual Meeting, Fredericton, New Brunswick. Field Excursion 4, 56 p.

Fyffe, L. R. and Pronk, A. G. 1985. Bedrock and surficial geology - rock and till geochemistry in the Trousers Lake area, Victoria County, New Brunswick. New Brunswick Department of Natural Resources, Mineral Resources Division, Report of Investigation 20, 74 p.

Greenough, J. D., McCutcheon, S. R. and Papezik, V. S. 1985. Petrology and geochemistry of Cambrian volcanic rocks from the Avalon zone in New Brunswick. Canadian Journal of Earth Sciences, 22, pp. 881-892.

Keppie, J. D., Currie, K. L., Murphy, J. B., Pickerill, R. K., Fyffe, L. R. and St-Julien, P. 1985. Appalachian geotraverse (Canadian mainland). Geological Association of Canada/Mineralogical Association of Canada Joint Annual Meeting, Fredericton, New Brunswick. Field Excursion 1, 181 p.

Keys, D. G. 1984. Variation in the energy content of peat. New Brunswick Department of Natural Resources, Mineral Resources Division, Open File Report 85-4, 126 p. (MSc thesis, University of New Brunswick).

McCutcheon, S. R. 1985. Genesis and entombment of Windsor Group evaporites, southern New Brunswick (abstract). Geological Association of Canada/Mineralogical Association of Canada Joint Annual Meeting, Fredericton, New Brunswick. Program with Abstracts, Volume 10, p. A38.

__________ 1985. Evolution of the Mississippian Mount Pleasant caldera, southwestern New Brunswick (abstract). Geological Association of Canada/Mineralogical Association of Canada Joint Annual Meeting, Fredericton, New Brunswick. Program with Abstracts, Volume 10, p. A38.

__________ 1985. Late Carboniferous structure in southern New Brunswick and its relationship to the Meguma Block (abstract). Maritime Sediments and Atlantic Geology, 21, Part 1.

__________ 1985. The Mount Pleasant caldera and the consanguineous Mount Pleasant deposit. In Granite-related Mineral Deposits: geology, petrogenesis and tectonic setting. Edited by R. P. Taylor and D. F. Strong. Canadian Institute of Mining and Metallurgy, Granite-related Mineral Deposits Symposium, Halifax, Nova Scotia. Extended Abstract, pp. 188-192.

McCutcheon, S. R., Roulston, B. V. and Webb, T. C. 1985. Stratigraphy and paleoenvironmental setting of the Windsor Group potash deposits, southeastern New Brunswick. Geological Association of Canada/ Mineralogical Association of Canada Joint Annual Meeting, Fredericton, New Brunswick. Field Excursion 5, 32 p.

Pickerill, R. K., Carter, D. C. and St. Peter, C. 1985. The Albert Formation - oil shales, lakes, fans and deltas. Geological Association of Canada/ Mineralogical Association of Canada Joint Annual Meeting, Fredericton, New Brunswick. Field Excursion 6, 75 p.

Pronk, A. G. 1985. Surficial geology and its relation to forest site classification (abstract). Geological Association of Canada/Mineralogical Association of Canada Joint Annual Meeting, Fredericton, New Brunswick. Program with Abstracts, Volume 10, p. A50.

Ruitenberg, A. A. and Fyffe, L. R. 1985. Characteristics and tectonic setting of granitoid-related deposits in New Brunswick. In Granite-Related Mineral Deposits: Geology, Petrogenesis and Tectonic Setting. Edited by R. P. Taylor and D. F. Strong. Canadian Institute of Mining and Metallurgy, Granite-related Mineral Deposits Symposium, Halifax, Nova Scotia. Extended Abstract, pp. 205-210.

Ruitenberg, A. A. and Fyffe, L. R. 1985. Mineral deposits related to tectonic evolution of New Brunswick - an overview (abstract). Geological Association of Canada/Mineralogical Association of Canada Joint Annual Meeting, Fredericton, New Brunswick. Program with Abstracts, Volume 10, p. A53.

Ruitenberg, A. A. and McCutcheon S. R. 1985. Tungsten, molybdenum and tin deposits in New Brunswick. Geological Association of Canada/Mineralogical Association of Canada Joint Annual Meeting, Fredericton, New Brunswick. Field Excursion 13, 33 p.

__________ 1985. Gold deposits of the Bay of Fundy coastal zone. Geological Association of Canada/Mineralogical Association of Canada Joint Annual Meeting, Fredericton, New Brunswick, Field Excursion 8, 15 p.

Ruitenberg, A. A., McCutcheon, S. R. and Davies, J. L. 1985. Gold environments in New Brunswick (abstract). Geological Association of Canada/Mineralogical Association of Canada Joint Annual Meeting, Fredericton, New Brunswick. Program with Abstracts, Volume 10, p. A53.

Salib, P. F., Barua, S. and Abbott, D. 1984. Demonstration of an integrated oil shale retort system, final report. New Brunswick Department of Natural Resources, Mineral Resources Division, Open File Report 85-2, 157 p.

Seaman, A. A. 1985. Granular aggregate resources, Nepisiguit Lakes map area (21 O/7), New Brunswick. New Brunswick Department of Natural Resources, Mineral Resources Division, Open File Report 85-5, 71 p., 1 map.

Seaman, A. A. 1985. Glaciation of the northern Miramichi Highlands, New Brunswick (abstract). Geological Association of Canada/ Mineralogical Association of Canada Joint Annual Meeting, Fredericton, New Brunswick. Program with Abstracts, Volume 10, p. A56.

Taylor, R. P. and MacLellan, H. E. 1985. Two contrasting styles of granite-related mineralization in the Burnthill-Dungarvon area of central New Brunswick (abstract). New Brunswick Branch of the Canadian Institute of Mining and Metallurgy, 16th Annual Mini-convention, Bathurst, New Brunswick.

Thibault, J. J. 1985. Granular aggregate resources and surficial geology of Sisson Branch Reservoir (21 O/6). New Brunswick Department of Natural Resources, Mineral Resources Division, Open File Report 85-3, 51 p., 2 maps.

Thibault, J. J., Seaman, A. A. and Mott, R. 1985. Geomorphic features associated with deglaciation and submergence in southwestern New Brunswick. Geological Association of Canada/Mineralogical Association of Canada Joint Annual Meeting, Fredericton, New Brunswick. Field Excursion 7, 19 p.

Webb, T. C. 1985. New Brunswick potash deposits: an overview (abstract). Geological Association of Canada/ Mineralogical Association of Canada Joint Annual Meeting, Fredericton, New Brunswick. Program with Abstracts, Volume 10, p. A67.

Williams, G. L., Fyffe, L. R., Wardle, R. J., Colman-Sadd, S. P., and Boehner, R. C. (editors). 1985. Lexicon of Canadian Stratigraphy, Volume 6, Atlantic Region. Canadian Society of Petroleum Geologists, 586 p.

MAP PLATES

MP 85-1 Granular aggregate resources of Sisson Branch Reservoir (21 O/6). Jacques J. Thibault. (1983). Scale: 1:50 000.

MP 85-2 Crown land quarry sites, 1984 to date. P. O'Leary. (1985). Scale: 1:500 000.

MP 85-3 Geology of New Brunswick. R. R. Potter, J. B. Hamilton, and J. L. Davies. (1979). Scale: 1:500 000. (black and white version of N.R.-1).

MP 85-4	Geological investigation of the Caraquet Dyke near Val Doucet, Gloucester Co., with drill sections and magnetometer survey (21 P/11). Jacques J. Thibault. (1985. Scale: 1:500.
MP 85-5	Till sample geochemistry, Nepisiguit Lakes (21 O/7). A. A. Seaman. (1983). Scale: 1:50 000.
MP 85-6	Surficial geology, Village of McAdam, York Co., N. B. (21 G/11). A. A. Seaman. (1984). Scale: 1:10 000.
MP 85-7	Surficial geology, Village of Chatham, Northumberland Co., N. B. (21 P/3). A. A. Seaman. (1984). Scale: 1:10 000.
MP 85-8	New Brunswick manganese occurrences. T. Webb. (1985). Scale: 1:500 000.
	Geology maps, North Head, Grand Manan (21 B/15). A. A. Ruitenberg and S. R. McCutcheon. (1983). Scale: 1:50 000 (See Open File Report 83-1).
MP 85-9	Surficial geology
MP 85-10	Bedrock geology
MP 85-11	Surficial geology of Perth-Andover (21 J/12). Jacques J. Thibault. (1983). Scale: 1:10 000.
	Surficial geology maps. Jacques J. Thibault. (1983). Scale: 1:50 0000. (8 1/2" x 11").
MP 85-12	Village of Drummond, Victoria Co. (21 O/4).
MP 85-13	Fredericton Junction (21 G/10).
MP 85-14	Petitcodiac (21 H/14)
MP 85-15	Alma, Albert Co. (21 H/10)
MP 85-16	Geological map of northern New Brunswick (21 O, P). J. L. Davies. (1977). Scale: 1:500 000. (black and white version of N.R.-3).
MP 85-17	Geology of Woodstock (21 J). L. R. Fyffe. (1982). Scale: 1:500 000. (black and white version of N.R.-4).
MP 85-18	Geology of the Mount Pleasant area, Sunbury and Charlotte counties (21 G/7). D. E. Gemmell. (1972). Scale: 1 inch equals 1/2 mile. (see U.N.B. thesis "Carboniferous volcanic and sedimentary rocks of the Mount Pleasant Caldera and Hoyt Appendage". D. E. Gemmell, 1975).
MP 85-19	Residual magnetic map, Mount Pleasant Caldera (21 G/7). D. E. Gemmell. (1973). Scale: 1 inch equals 1/2 mile. (overlay for MP 85-18).
MP 85-21	Log of test well 160, Stoney Creek (21 H/15). N. B. Oilfields Ltd. (1951). Scale: 1 inch equals 100 feet.
MP 85-22	Mineral occurrence map of New Brunswick. B. M. W. Carroll. (1978). Scale: 1:500 000. (black and white version of N.R.-2).

	Cape Spencer-Black River area, geochemistry of humus and B-horizons (21 H/4). A. G. Pronk. (1985). Scale: 1 inch equals 1/4 mile.
MP 85-23A	Copper
MP 85-23B	Lead
MP 85-23C	Zinc
MP 85-23D	Gold, arsenic
MP 85-23E	Silver
MP 85-24	Surficial geology of Cape Spencer-Black River area (21 H/4). A. G. Pronk. (1984). Scale: 1 inch equals 1/4 mile.
MP 85-25	Major physiographical regions of New Brunswick. Scale: 1:1 000 000. (from G.S.C. Memoir 416).
MP 85-26	Coal licences and exploration blocks in New Brunswick. R. Shaw. (1985). Scale: 1:500 000.
MP 85-27	Tender proposal for gravity coverage of the Magundy Hill-Blaney Ridge area (21 G/14). Scale: 1:10 000.
MP 85-28	Geology of gold-bearing rocks in the Lorneville-Lepreau area (21 G/1). S. R. McCutcheon. (1984). Scale: 1:50 000.
MP 85-29	Gold occurrences in northern New Brunswick (21 I, J, N, O. P). J. L. Davies. (1984). Scale: 1:500 000.
	Granular aggregate resource maps. Jacques J. Thibault and A. A. Seaman. (1984). Scale: 1:50 000.
MP 85-30	Grand Lake (21G/16).
MP 85-31	Codys (21 H/13).
MP 85-32	Salisbury (21 I/3).
MP 85-33	Chipman (21 I/4).
MP 85-34	Salmon River Road (21 I/5).
MP 85-35	Harcourt (21 I/6).
MP 85-36	Buctouche (21 I/7).
MP 85-37	Richibucto (21 I/10).
MP 85-38	Rogersville (21 I/11).
MP 85-39	Kouchibouguac (21 I/14).
MP 85-40	Point-Sapin (21 I/15).
MP 85-41	Minto (21 J/1).
MP 85-42	Boiestown (21 J/8).
MP 85-43	Point Escuminac (21 P/2).
MP 85-44	Chatham (21 P/3).

CHAPTER 2. MINERAL EXPLORATION IN NEW BRUNSWICK

METALLIC MINERALS[2,3]

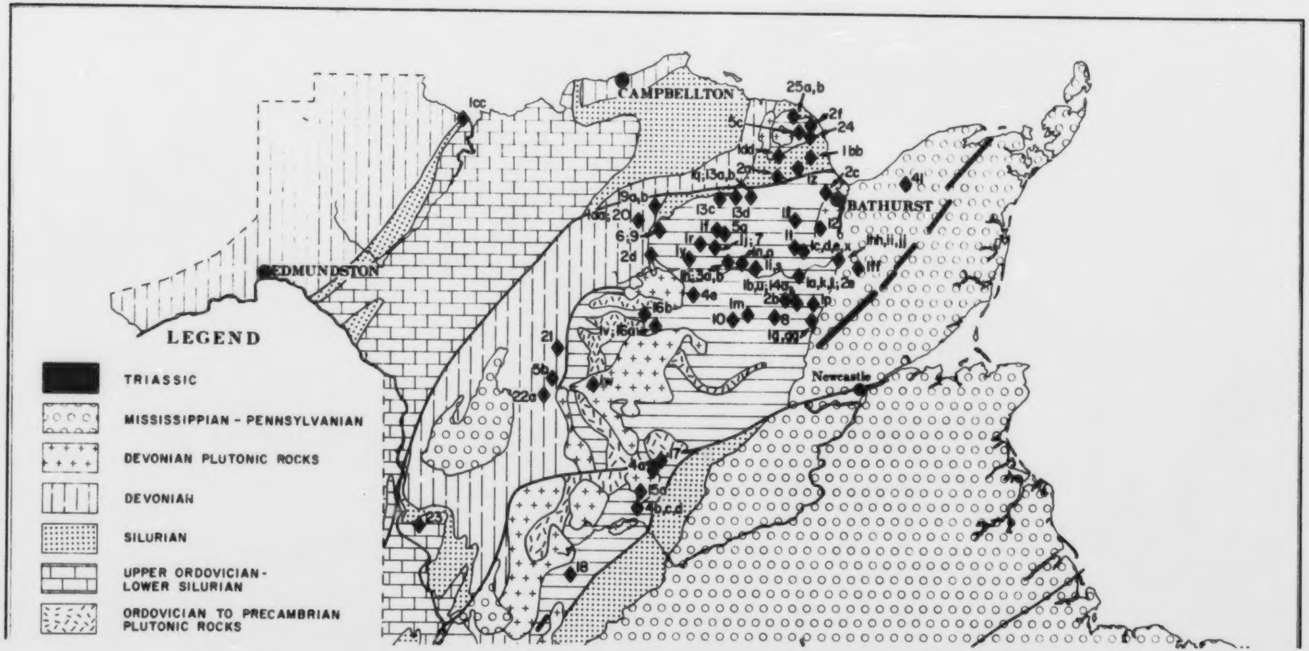
There was a marked increase in exploration activity in northern New Brunswick in 1985 (Figure 16), primarily due to Lacana Mining Corporation's gold discovery in the Alcide area, and the Smith gold discovery near the Southeast Upsalquitch River. The combined effect led to a staking rush covering the Rocky Brook-Millstream Fault system from the Baie de Chaleur to Mulligan Gulch approximately 75 km to the southwest. In the course of exploration, Noranda/Brunswick Mining & Smelting, who again carried out the bulk of mineral exploration, reported at least three new gold showings in the Upsalquitch-Mulligan Gulch area. Lacana's follow-up work on its Alcida showing included 22 drill holes that have outlined a significant gold deposit (Elmtree Brook claim group, p. 79).

In other developments, Lincoln Resources was unable to raise sufficient funds to proceed with its ambitious programme on the Restigouche sulphide deposit, and hence Placer Development Limited will retain its interest in the property.

Northumberland Mines Limited carried out a prefeasibility study of the Murray Brook deposit gossan (owned by Kennco Explorations (Canada) Ltd.) that indicated a profitable operation based on a gold price of $325. per ounce (U. S.). A drilling programme outlined 1 900 000 t grading 1.34 g/t (0.039 oz./ton) gold and 45.6 g/t (1.33 oz./ton) silver.

Atlantic Orebodies Limited, who acquired exclusive rights to 4144 km^2 of the Carboniferous Platform, drilled one hole near Newcastle on the north side of the Miramichi River. The purpose of the hole was to obtain stratigraphic information related to possible sulphide deposits in the Carboniferous rocks and the lower Paleozoic basement. The hole, drilled to a depth of 1039.9 m, penetrated approximately 985 m of Carboniferous sedimentary rocks before it ended in altered mafic volcanic rocks of unknown age.

Several companies and individual prospectors conducted extensive exploration programmes in southern New Brunswick during 1985. Billiton Canada Limited and Lac Minerals Limited announced an agreement to explore and develop the recently discovered endogranitic tin ore zone at Mount Pleasant. This zone contains drill-indicated reserves of 5 900 000 averaging 0.79% tin. At year end, 28% of a 1300 m decline and surface drilling that indicated previously unknown ore zones were completed. A $3 500 000 programme, including diamond drilling, bulk sampling, metallurgical investigations and pilot plant testing to produce data for a feasibility study, will be carried out in 1986. Lac Minerals Limited also conducted a precious metals exploration programme in the Annidale area about 20 km west-northwest of the town of Sussex. This work will be continued in 1986.


CAMPBELLTON
BATHURST
EDMUNDSTON
Newcastle
LEGEND
TRIASSIC
MISSISSIPPIAN - PENNSYLVANIAN
DEVONIAN PLUTONIC ROCKS
DEVONIAN
SILURIAN
UPPER ORDOVICIAN - LOWER SILURIAN
ORDOVICIAN TO PRECAMBRIAN PLUTONIC ROCKS
1cc
25a,b
2f
24
5c
1dd
1bb
2c
41
2a
1z
1q;13a,b
19a,b
20
6;9
2d
13c
13d
5a
1f
1r
1j;7
1y
1x
1ff
1c,d,e,x
1hh,ii,jj
12
11
1a,k,l;2e
1b,u;14a
2b
1p
1m
10
8
1q,gg
4e
16b
1v;16a
21
5b
22a
17
4a
15a
4b,c,d
18
23

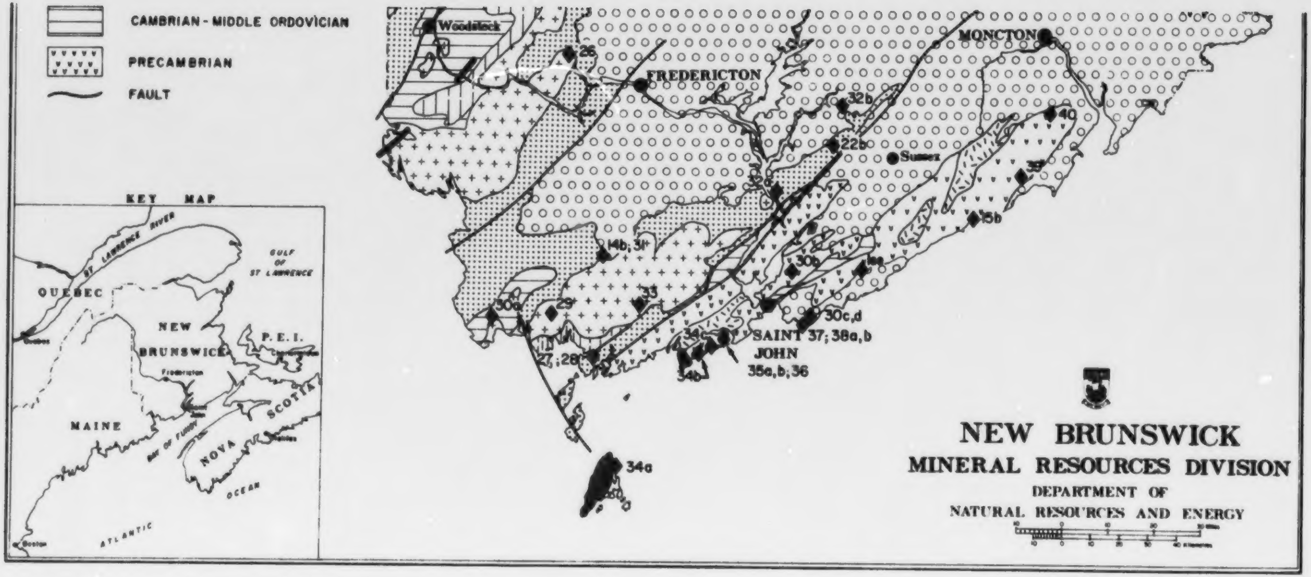

CAMBRIAN - MIDDLE ORDOVICIAN
PRECAMBRIAN
FAULT
KEY MAP
QUEBEC
ST LAWRENCE RIVER
GULF OF ST LAWRENCE
NEW BRUNSWICK
P. E. I.
MAINE
NOVA SCOTIA
BAY OF FUNDY
ATLANTIC
OCEAN
Woodstock
FREDERICTON
MONCTON
Sussex
SAINT JOHN
26
32b
22b
40
39
15b
14b; 31
33
29
30a
27; 28
34c
34b
34a
30b
30c,d
37; 38a,b
35a,b; 36
NEW BRUNSWICK
MINERAL RESOURCES DIVISION
DEPARTMENT OF
NATURAL RESOURCES AND ENERGY

Figure 16. Location of properties for which assessment reports were filed in 1985 (legend continued on next page.

Companies and Individuals Exploring Properties in 1985
(to accompany Figure 16)

1. Brunswick Mining and Smelting Corporation Limited
2. Norman Pitre
3. BP Resources Canada Limited
4. Kidd Creek Mines Ltd.
5. Lacana Mining Corporation Ltd.
6. A. J. O'Donnell
7. Granges Exploration Ltd.
8. J. C. Pitre
9. Kennco Explorations (Canada) Ltd.
10. Northeast Exploration Services Ltd.
11. Esso Minerals Canada Ltd.
12. John Duncan
13. Anaconda Canada Exploration Ltd.
14. Billiton Canada Limited
15. Mactaquac Mining Ltd.
16. K. D. A. Whaley
17. Durham Resources Inc.
18. Miramichi Lumber Company Limited
19. Michael Smith
20. Wayne Carroll
21. Tintina Mines Ltd.
22. Lac Minerals Limited
23. Upper Kent Lime Works Limited
24. M. I. Watson
25. Heron Mines Limited
26. Shediac Bay Resources Inc.
27. Highbourne Explorations Limited
28. Mascarene Mines Limited
29. Appalachian Resources, Inc.
30. Morton Gordon
31. Sullivan Resources Ltd.
32. Maritime Resource Research Limited
33. Derek Brown
34. Kinbauri Gold Corporation
35. Newbrun Resources Ltd.
36. Peter Fenety and Paul Burke
37. Mark McNamara
38. H. C. McNamara
39. J. Newhouse
40. J. A. Roy McIntyre
41. Sharpe Energy & Resources Ltd.

Durham Resources Inc. staked nickel- and copper-sulphide-bearing mafic intrusions northeast of the town of St. Stephen in southwestern New Brunswick. The recent discovery of platinum minerals associated with nickel-copper-sulphide deposits at St. Stephen has revived exploration interest in the area.

Gordex Minerals Ltd. and an associated company, Newbrun Resources Ltd., conducted an active exploration programme in areas of southern New Brunswick other than the Cape Spencer area. The St. Stephen nickel deposit was staked when platinum was found to be associated with the nickel sulphides. The True Hill tin prospect west of Mount Pleasant was staked when the ground came open. An exploration program was also conducted on the porphyry-copper-gold occurrences west of Musquash Harbour, the Golden Grove graphite deposit northeast of Saint John, and beryllium-bearing rocks near Zealand Station.

Mr. Harold McNamara of Saint John continued trenching at his Millican Lake gold prospect, which constitutes the northeastern extension of the Cape Spencer gold-bearing zone. Several well-mineralized, gold-bearing lenses, similar to those on the Gordex property, were found on the McNamara property. Encouraged by these results, Mr. McNamara initiated a company, Mispec Resources Inc., to develop his prospect.

Rex Silver Mines Ltd. continued exploring for gold in the Bay of Fundy coastal zone southwest of Saint John. A diamond drilling programme was initiated to test porphyry-copper-gold occurrences in the Musquash Harbour area.

U.S. Borax Inc. drilled three holes in the 'old Vernon mine' copper-gold prospect east of Martin Head, along the Bay of Fundy coast. Earlier reports mentioned ore grade assays from this area. Stream sediments also yielded highly anomalous gold values in this area.

Esso Resources Canada Ltd. and prospectors Peter Fenety, Wayne Hunter, J. Roy McIntyre and William Walton staked and prospected gold-bearing rocks along the southwestern extension of the Pendar Brook Fault zone. This fault zone includes an old prospect known as the Shear gold mine and the stibnite-gold occurrence at Pendar Brook. The southwestern extension of the structure was recently delineated as a result of a detailed investigation of the eastern Saint George Batholith and its contact aureole. This investigation is being conducted as part of the Mineral Development Agreement between the Government of Canada and the Province of New Brunswick.

Maritime Resources Research Ltd. continued its gold exploration programme in the Wickham area about 40 km north of Saint John. Low gold values were found in several localities.

The following are brief descriptions of the assessment reports received by the Mineral Resources Division in 1985. The property locations are given in Figure 16.

EDITOR'S NOTE:

The first name (company or individual) given for each assessment report is that of the holder of the mining rights. Since the author of the report may not be the holder of the rights, please consult the Geoscan index for cross-reference information.

MIRAMICHI ZONE

(1) Brunswick Mining and Smelting Corporation Limited

(a) Nepisiguit Brook Property, M. L. 1376,
Project 4366 (473256) 21 P/05W

This 65-claim property is located approximately 34 km southwest of Bathurst.

Glacial overburden was reported along approximately 80-85% of the 4.3 km grid in the northwestern corner of the property. A large portion of the area is underlain by felsic and crystal tuffs. No sulphide mineralization has been reported in the area.

B-horizon soil samples revealed a soil anomaly in the northwestern corner of the grid. Maximum assay values were 155 ppm Pb, 450 ppm Zn, 36 ppm Cu and 2.0 ppm Ag.

One previously completed diamond-drill hole was reported to intersect two separate, heavily pyritized, sulphide zones in felsic volcanics. No assays were reported. Additional ground follow-up work was strongly recommended.

(b) Captain Claim Gp., Project 4C82
(473203, 473218) 21 P/05W

This property, comprising 50 claims, is 15 km east of the Heath Steele mine. The property covers a massive sulphide deposit discovered in the 1950s by Captain Yellowknife Gold Mines.

A diamond-drill programme in 1985 was aimed at testing the deposit at depth and along strike to the north. Drill holes intersected a mineralized horizon (0.57% Cu) with no other significant base or precious metal assays. The report concluded that there was a poor probability of finding significant near-surface sulphides. A borehole Pulse EM survey was recommended to trace the deposit to the north.

A second report indicates that a DEEP-EM survey did not detect appreciably sized conductive bodies within 200 m of the surface. The horizon containing the Captain showing was traced to the north and south as a zone of poor conductivity. The soil geochemical survey (B-horizon) did not indicate the Captain deposit, due to swampy ground conditions and poor sample density. Over the claim group, Pb anomalies (with assays as high as 773 ppm) are the dominant feature. Anomalous values for other samples were 119 ppm Cu, 802 ppm Zn, and 2.5 ppm Ag, associated with a lead-zinc anomaly.

(c) Fab Property, M. L. 1341, Project 117 (473208) 21 P/05W

This 296.1 ha mining licence is located between Brunswick No. 12 mine and No. 6 open pit southwest of Bathurst.

The property is an extension of the Fab Property that lies over the so-called 'Brunswick horizon'. The work in 1985 comprised 10.34 km of gravity, proton magnetometer and MaxMin II EM surveys. Drilling indicated that the gravity and electromagnetic anomalies were attributable to a sequence of thick, locally graphitic, sedimentary rocks. Angular boulders of dark magnetic iron formation similar to that in the 'Brunswick horizon' were common immediately east of a gravity anomaly. Trenching of the gravity anomaly was recommended. Compilation of data suggests that the favourable volcanic rocks between No. 12 and No. 6 lie in the eastern portion of the property.

(d) Mersereau-Pitre Option, Project 229 (473220) 21 P/05W

This property consists of 2 claims, located within the central portion of the Fab property, 22 km southwest of Bathurst.

In 1985 geological mapping, a VLF/EM survey and 612.6 m of diamond drilling were carried out. The aim of the work was to help solve stratigraphic and structural problems. Two holes were drilled to test gravity, electromagnetic, and magnetic anomalies. No significant mineralization was intersected. The continuation of drilling was recommended to test the zone that may represent the 'Brunswick horizon'.

(e) Fab Claim Gp., Project 218 (473219) 21 P/05W

This 32-claim property is located 22 km southwest of Bathurst and approximately 7 km from Brunswick No. 12 mine. The property lies on the so-called 'Brunswick horizon' between the Brunswick No. 6 and Brunswick No. 12 deposits. Previous work included linecutting, magnetometer, gravity, and MaxMin II horizontal-loop EM surveys.

The 1985 exploration programme included geological, borehole Pulse EM, VLF/EM, and a diamond-drilling programme consisting of seven holes. The 71 km VLF/EM survey, completed over two grids, revealed anomalies trending east-west on the north grid, and north-south on the eastern grid. Both grids are underlain by highly deformed Ordovician volcanic and sedimentary rocks similar to those that host the Brunswick No. 6 and No. 12 deposits.

Nine holes (3841.9 m) have been drilled since late 1984. Eight were drilled to test the 'Brunswick horizon'. Iron formation associated with the horizon was not distinct, but it is throught that intersections of chloritic sediments, commonly with stringers or disseminated sulphides, may represent the 'Brunswick horizon'.

The drill holes intersected felsic tuffs, quartz-eye schist, quartz-feldspar-eye schist and crystal tuff, similar to those in the stratigraphic footwall of No. 12 mine. However, more work is required to determine the stratigraphic and structural relationships of the rocks underlying the property.

A large conductive body was found in all five holes surveyed with the borehole Pulse EM. The anomaly, which is below the depth of penetration by conventional surface electromagnetic methods, is interpreted as either a thick conductor, or a thin conductor repeated by folding.

Magnetic anomalies were attributed to pyrrhotite or hanging wall magnetite-bearing tuff. The highest potential for finding a massive sulphide deposit was concluded to be at depth, along zones correlated with the 'Brunswick horizon'.

(f) South Forty Mile Brook Claim Gp., Project 4C11 (473233) 21 O/09W

This 36-claim block is located 48 km west of Bathurst and 4.5 km south of the Caribou mine. The block is underlain by a highly deformed, felsic, crystal-tuff sequence intercalated with sedimentary lithic tuffs and minor amounts of felsic, cherty tuffs. The 1985 work comprised soil geochemical, VLF/EM, magnetometer and geological surveys.

The soil survey revealed prominent Pb, Cu, Zn, and Ag anomalies along arcuate linears and related northeasterly trending faults in the southwestern part of the claim block. The anomalies, ranging up to 93 ppm Cu, 5400 ppm Pb, 760 ppm Zn, and 1.9 ppm Ag, seem to correlate with a fault outlined by geological mapping.

A magnetometer survey completed in September of 1985 revealed a significant trend in the northwest portion of the grid. A VLF/EM survey indicated four major conductors. The responses are moderately strong and linear, indicating vertical or steeply dipping shear or fault structures with related splays.

Two significant features, namely, the coincidence of geochemical anomalies with a major VLF EM trend and a magnetic anomaly flanked by two VLF EM anomalies, are worthy of follow-up work. Four trenches have been recommended.

(g) Pats Brook Claim Gp., Project 224
(473257) 21 P/05W

The 56-claim Pats Brook property is located 27 km northwest of Newcastle.

The 1985 compaign comprised the cutting of 63.4 km of grid line, and magnetometer, gravity, and MaxMin II EM surveys. The magnetic relief was generally less than 40 gammas, indicating a weakly magnetic source. The gravity survey revealed only one anomaly, and the MaxMin II EM survey (51.2 km) indicated low frequency conductors, in keeping with the conductivity of Ordovician rocks. The MaxMin II EM anomalies do not coincide with the magnetometer or gravity anomalies.

It was concluded that a large sulphide source is not present under the property, and no further work was recommended.

(h) White Birch Claim Gp., Project 4C13
(473217) 21 O/08E

This 6-claim group is located approximately 6.5 km west-northwest of the abandoned Wedge mine. Work filed in 1985 consisted of linecutting and a VLF EM survey over a known, low-grade, massive sulphide body. The survey outlined the massive sulphide zone and a marginal conductor to the west. A MaxMin II EM survey was recommended.

(i) Rogers Lake Camp Property, M. L. 1382,
Project 215 (473200) 21 O/08E

This 36-claim property is located approximately 43 km southwest of Bathurst. Grid line that was cut in 1985 extended the southwest grid system to the western limit of the property. Gravity, electromagnetic, magnetometer and geochemical surveys were conducted on the new lines. These surveys were followed by geological mapping and diamond drilling.

Most geophysical anomalies do not appear to be associated with significant mineralization. A significant, but narrow, Cu-Pb-Zn soil anomaly is associated with weak magnetic and electromagnetic anomalies. Holes drilled to test this target intersected only minor mineralization.

As a result of the survey, ore-grade, massive sulphide zones are not expected to be found less than 150 m below surface.

(j) Indian Lake Property, M. L. 1374, Project 124 (473248) 21 O/08E, W

The Indian Lake property is located about 48 km southwest of Bathurst. Work filed in 1985 comprised line-cutting, diamond drilling, magnetometer, electromagnetic, gravimetric, and soil geochemical surveys.

The magnetometer survey outlined several short, narrow, north-south-trending anomalies and one larger (1067 m long), easterly dipping anomaly. The latter continues to the south into Brunswick's M. L. 1340. Mapping on the southern extension indicated magnetic slates and argillites as source rocks.

The electromagnetic survey outlined one interesting anomaly in the east corner of the property. It lies on strike with the weak northern extension of the electromagnetic anomaly associated with the Strachens Lake sulphide zone, 914 m to the south. No clear coincident gravity anomaly was found. Other gravity peaks on the grid did not coincide with significant electromagnetic anomalies.

Soil samples from the B-horizon were analyzed for Cu, Pb, Zn, and Ag. The few anomalies indicated seem to be drainage controlled, and have no associated geophysical anomalies.

On an adjacent property, four drill holes, totalling 1348 m, were put down to test geophysical anomalies. No base or precious metals were intersected.

(k) Sabina Option, M. L. 1369, Project 4362 (473160) 21 P/05W

This repeatedly investigated property is underlain by mainly Ordovician felsic volcanics and sediments that are cut by a quartz-feldspar porphyry dyke. The property is approximately 35 km southwest of Bathurst.

Previous work includes: two linecutting campaigns (1954, 1966), two ground electromagnetic surveys (1954, 1966), a detailed geological survey, two magnetometer surveys (1966, 1974), and an airborne electromagnetic survey.

In 1985, a 5 km grid was cut, and airborne EM and magnetic surveys were reported to be in progress. The magnetometer survey in 1966 detected several narrow, linear anomalies; iron formation has been suggested as the cause. Results from the 1985 survey have not been reported.

(l) Sabina Property, M. L. 1370, Project 4362 (473159) 21 P/05W

This property is located approximately 40 km southwest of Bathurst. Work filed consisted of linecutting (10.4 km), and magnetometer, MaxMin II HEM, and soil geochemical surveys. The magnetometer survey produced only a few anomalous readings near the southeast corner of the property. The HLEM (MaxMin II HEM) survey outlined a number of parallel, closely spaced conductors, possibly explained by the presence of graphitic sediments. Some of the stacked profiles from these survey results are erratic and attributed to chaining errors.

No geochemical anomalies were located as a result of the analysis (Pb, Zn, Cu, Ag, Au) of 2248 soil samples collected from the B-horizon. A few samples with high Zn values in the southeast corner of the property are coincident with anomalous magnetic readings. Further investigation of the southeast corner is contingent upon airborne (helicopter) electromagnetic and magnetic survey results not yet reported.

(m) Satellite Claim Gp., Project 4358 (473135) 21 O/01E

This group of 51 claims was staked in 1983 on the basis of work done in the 1950s that indicated sulphide mineralization in two areas, the 'Satellite zone' and the 'Mowat horizon'. The property lies 55 km southwest of Bathurst and 7 km west-southwest of the Heath Steele mine. Subsequent work comprised proton magnetometer, VLF EM16, MaxMin II, gravity, soil geochemical and geological surveys over selected areas of the property.

The claims are underlain by a sequence of deformed and matamorphosed felsic pyroclastics with interbedded metagreywacke, phyllite, chloritic schist and iron formation. The rocks lie in an antiform whose axial trace trends southeast. A westerly trending fault with 900 m of displacement is another prominent feature.

A soil geochemical survey detected slight anomalies over the two known zones of mineralization, and located two new sites. One is probably due to hydromorphic dispersion from adjacent properties, whereas the other is associated with EM and magnetic anomalies.

Geophysical surveys more clearly defined the 'Satellite' and 'Mowat' zones. Two conductors flanked the 'Satellite' antiform, as well as the offset 'Mowat' extension. The gravity survey results indicate no significant anomalies.

Further work was recommended for all areas of the property containing anomalies.

(n) Canoe Landing Lake Property, M. L. 1231, Project 212 (473133) 21 O/08E

This mining licence covers a massive, low-grade, pyritic, zinc-lead-silver sulphide deposit. The work reported comprises a geochemical survey and diamond drilling.

The geochemical soil survey was conducted to detect any overlying gossan that could be enriched in precious metals. No gossan-type material was found.

Four diamond-drill holes totalling 3262 m were put down in 1983 and 1984. Compilation of these and old drill hole data suggests that there are no less than nine distinct, overlapping, massive sulphide layers or lenses, but repetition due to faults or folds is probable. Reserves on the property have been recalculated as follows:

Reserves	Cu (%)	Pb (%)	Zn (%)	Ag (g/t)	Au (g/t)
20 380 000	0.56	0.64	1.82	29.5	1.07

Because of the results of work to date, no further work was recommended.

(o) Canoe Landing Lake Extension Claim Gp.,
Project 211 (473245) 21 O/8E

This 11-claim group is located approximately 43 km southwest of Bathurst. In 1984 two drill holes totalling 270 m were completed. No significant base or precious metals were intersected (the best intersection was 1.30% Pb+Zn and 0.07 g/t (0.002 oz./ton) Au over 0.3 m. All geophysical, geochemical and geological targets on the property have been drilled or otherwise explained. No economic mineralization was encountered, and it was recommended that all claims be allowed to lapse.

(p) Portage River Claim Gp.,
Project 222 (473184) 21 P/05W

The Portage River claim group consists of 175 claims located approximately 48 km south-southwest of Bathurst and 37 km northwest of Newcastle. The area is underlain by mainly Ordovician rocks: primarily fine-grained, polydeformed, black argillite to granular greywacke, intercalated with felsic and mafic volcanics and intruded by gabbro and metagranite. Work performed in 1984 and 1985 comprised linecutting, geological mapping, and proton magnetometer, geochemical soil, gravity, and MaxMin EM surveys. Several interesting and potentially promising geophysical targets were found but no obvious geochemical targets were detected. Although pyrite and copper mineralization was observed, the economic potential of the property was judged to be low. Most geophysical anomalies can be explained by graphite, mafic volcanics, faults, and deep overburden. One unexplained anomaly may warrent drilling.

(q) Bear Creek Property, M. L. 1363,
Project 4337 (473191) 21 O/09E

This group of 66 claims is located approximately 32 km west of Bathurst on the Restigouche-Gloucester county line. Work reported in 1984 comprised two drill holes totalling 301 m. DDH 4337-84-1, drilled to test a magnetometer anomaly, encountered graphitic rocks. DDH 4337-84-2 investigated a strong geochemical soil anomaly (12 000 ppm Pb, 900 ppm Zn, 7.0 ppm Ag, and 550 ppm As). The anomaly is near a transition zone associated with a felsic metavolcanic-metasedimentary rock contact.

The drill hole intersected a 39 m interval of pyrite stringers containing sphalerite, galena and chalcopyrite, but the grade was low.

(r) Forty Four Mile Brook Claim Gp., Project 4386 (473164) 21 O/08W

This 30-claim group is located approximately 52 km west-southwest of Bathurst. It has been explored intermittently since 1956 by a number of companies. Efforts were focused primarily upon finding the source of several significant stream sediment and soil anomalies with maximum assays of 120 ppm Cu, 1200 ppm Pb, and 2400 ppm Zn. The work filed for 1984 comprised linecutting, geological, magnetic, VLF EM, and geochemical surveys.

The area is underlain by felsic, lithic, and crystal tuffs interbedded with a wide zone of graphitic metasedimentary rocks. Strong VLF EM conductors delineated the graphitic metasediments but several weaker ones were also outlined. Soil geochemical sampling has outlined a narrow, irregularly shaped, Pb-Zn anomaly with maximum assay values of 1800 ppm Pb and 1500 ppm Zn. It is coincident with a weak VLF EM conductor. The magnetic survey results proved inconclusive. Trenching is recommended on four geochemical anomalies.

(s) Swamp Lake Property, M. L. 1361 (473232) 21 O/08E

The Swamp Lake property is located 37 km southwest of Bathurst near Canoe Landing Lake. The work filed for 1985 consisted of seven diamond-drill holes totalling 2291 m. No significant mineralization was intersected and the down-hole EM survey (hole 206-11) was "not encouraging". Typical assays from weakly mineralized zones are given below.

Hole No.	Interval (m)	Width (m)	Cu (%)	Pb (%)	Zn (%)	Ag (g/t)
206-6	376.4-376.7	0.3	0.04	1.73	3.15	21.60
	420.3-420.9	0.6	0.02	0.92	2.24	8.23
206-7	153.8-054.2	0.4	0.01	2.31	0.18	3.43

The drilling penetrated sedimentary and felsic volcanic rocks typical of the Tetagouche Group.

(t) Grandroy Option, M. L. 1295 (473236) 21 P/5W

The Grandroy Option is located 26 km south of Bathurst and is traversed by the highway to the Brunswick No. 12 deposit. Work reported in 1985 comprised one diamond-drill hole (DDH No. 122-2), completed to a depth of 258 m. The hole was drilled to test coincident EM17, gravity, magnetic and geochemical anomalies that might represent the No. 12 ore horizon. The hole penetrated quartz-eye schist, crystal tuff, sediments, and felsic tuffs. No massive sulphides were intersected; however, the geophysical and geochemical anomalies were explained by the presence of disseminated Pb-Zn sulphides (less than 1% combined) in a weakly chloritic, magnetic sediment intersected from 223 to 234 m. Further work is planned on untested anomalies.

(u) CNE Claim Gp. (473181) 21 P/05W

The CNE claim group is situated in Bathurst Parish, Gloucester County, approximately 15 km east of the Heath Steele mine. Six claims make up the south block, and four claims comprise the north block. Previous work, conducted between 1974 and 1978 by Sabina Industries, included VLF EM, HEM, Horizontal Shootback EM, IP, magnetometer, geological, and extensive soil and till geochemical surveys. Seven drill holes were put down to test the targets outlined.

Recent work on the property, 1983-1985, included the recutting and rechaining of 5.6 km of magnetometer lines. VLF EM, HEM (MaxMin II) and soil geochemical surveys detected a weak conductor on the west leg of the south block. The response occurs over swampy ground flanked by massive rhyolite to the east. A stronger response occurs on the eastern portion of the north block. The trend is in part coincident with sediments drilled by Sabina in 1978; however, no conductive material was found in the drill core.

The results of an HEM (MaxMin II) survey were disappointing; the survey even failed to pick up a previously documented HEM conductor. The magnetometer survey results were flat, with the exception of a positive magnetic gradient on the western part of the north block.

B-horizon soil samples were collected from the south and north blocks and analyzed for Cu, Pb, Zn, Ag, and Au. If B-horizon soil was not obtainable, organic material was collected. Gold assays were below the detection limit for both blocks. A weak Pb-Zn anomaly (up to 150 ppm Pb and 226 ppm Zn) occurs on the west leg of the south block near a weak VLF EM trend.

A significant multielement geochemical anomaly occurs in the northeast portion of the north block. Values range up to 1370 ppm Zn, 470 ppm Pb, 103 ppm Cu and 3.2 ppm Ag. The anomaly is coincident with a VLF-EM trend. Sabina's drilling, farther to the south in 1978, could not explain the anomalies. Follow-up plans for the property are not reported.

(v) Kagoot Brook Claim Gp., Project 44-185 (473161) 21 O/02E

This 25-claim property lies 25 km east-northeast of Serpentine Lake. The property is underlain by Cambro-Ordovician felsic volcanics and sedimentary rocks, in part altered by a Devonian granite. Interest in the area was generated by anomalous results obtained from a regional geochemical silt sampling survey conducted by the New Brunswick Department of Natural Resources. The 1984 exploration programme was intended to determine the mineral potential of this area. It was compared with the lead-zinc-silver-cobalt model developed from known Cambro-Ordovician mineral deposits.

The work comprised a 4.6 km proton magnetometer survey and a 13 km VLF EM survey. The electromagnetic survey indicated three strong anomalies (referred to as areas 1, 2, and 3) and two weaker ones.

Soil sampling results indicated a strong association of Cu, Ag, and Co with the VLF EM conductors. Pb and Zn also showed a weak association in some places. For area 1, the northernmost area of interest, maximum assays of 238 ppm Cu, 92 ppm Pb, 5.3 ppm Ag and 880 ppm Co were reported.

A large area having anomalous Ag assays has been found in area 2. Maximum Ag assays of 13.3 ppm and 2.1 ppm were reported. In area 3, a weak Pb, Cu, and Ag anomaly surrounds the most southerly VLF EM conductor.

Preliminary silt sampling along the streams within and near the property indicated strongly anomalous Co assays (up to 6000 ppm). Cu, Pb, Zn, Ag and Ni were also anomalous, with values up to 260 ppm, 112 ppm, 427 ppm, 4.1 ppm and 215 ppm, respectively. Heavy-mineral pan concentrates had very high background values for Au but assays were not reported. Recommended work includes soil sampling and completion of more intensive VLF EM and magnetometer surveys to determine drilling and trenching targets.

(w) Sears Lake-Mt. McInnis Claim Gp. (473154) 21 O/02W

The 135-claim Sears Lake property is located in Southesk Parish, Northumberland County, approximately 5 km northeast of Long Lake. The property was staked as a result of a New Brunswick Department of Natural Resources data release that reported anomalous Pb and Zn assays from silts of streams draining the area south of Sears Lake. The group is composed of two parts: the Mauran Lake grid area, and the Mt. McInnis claims.

In the Mauran Lake area, Brunswick Mining and Smelting Corporation Limited reported up to 7560 ppm Pb and 6000 ppm Zn in silt samples. A total of 962 soil samples were tested for Cu, Pb, Zn, and Ag. Also, 479 samples were tested for W and 283 for Sb.

Numerous strong Pb and Zn soil anomalies were located, a few with maximums of 4400 ppm Pb and 7000 ppm Zn. Anomalous W values (up to 44 ppm) were also outlined, but Sb values were negligible. The poorly exposed bedrock appears to be mainly granite with xenoliths or roof pendants of gabbro, basalt and chloritic sedimentary rocks.

A VLF EM survey revealed conductive zones that were interpreted as fractures and faults, or expressions of contacts between granite and metasediment xenoliths or gabbro. The extremely high Zn and Pb values in silts and soils indicate that some of the VLF EM anomalies might be caused by sulphide mineralization.

The 16-claim Mt. McInnis block is connected to the northeast corner of the Mauran Lake grid area. The 325 soil samples taken indicated three clusters of Ag anomalies with maximum assays of 1.7 and 4.4 ppm.

Chloritic metasediments are the possible source for the soil and silt Pb-Zn anomalies in the Mauran Lake grid area. The W soil anomalies are probably due to scheelite or wolframite mineralization peripheral to the granite stock or granite cupola(s). Detailed geological mapping and prospecting is recommended, as is selected trenching to explore anomalies.

(x) Maritimes Mining Property, Project 105, M. L. 1244 (473202) 21 O/05W

This 301.4 ha property is located 24 km south-southwest of Bathurst. In 1985, a diamond-drill hole tested a weak electromagnetic anomaly caused by a previously reported 0.6 m sulphide intersection grading 2.58% Zn. No significant Pb-Zn mineralization was found. A newly discovered VLF EM anomaly correlates well with one found to the north in 1963. Selective diamond drilling and gravity programmes are recommended.

(y) Hilltop Claim Gp. (473207) 21 O/08W

This 20-claim group is located approximately 60 km southwest of Bathurst. Work filed for 1985 comprised VLF EM and magnetometer surveys. Three discontinuous linear VLF EM anomalies trend northwest-southeast. The eastern zone shows no correlation with magnetics, while the central and western zones show major magnetic associations. The electromagnetic and magnetic correlations are probably attributable to a pyrite-pyrrhotite association.

Recommended future work entails obtaining soil and MaxMin II data over the three coincident magnetic and conductivity anomalies.

(2) Norman Pitre

(a) Nicholas Denys Claim Gp. (473260) 21 P/12W

Previous work by Zarina Exploration in the mid-1970s outlined four gold veins, the best one grading 111.1 g/t Au over 30.5 cm, and 990 g/t Au and 573.8 g/t Ag over 46 cm. Drill intersections indicated a stockwork with individual veins, 0.64-15.2 cm wide, grading 0.31-35.5 g/t Au.

The gold-bearing zone comprises quartz-carbonate veins and minor massive pyrite stringers associated with northwesterly trending faults. The faults intersect foliated Silurian-Ordovician metasediments and Devonian felsic dyke. This occurrence has characterics similar to those of Lacana's Alcida gold occurrence. Work in 1985 was limited to clearing a part of the main vein.

(b) Railroad Claim Gp. (473212) 21 P/05W

Eighteen samples of till were collected in the northern section of this 9-claim group. Maximum assays of 204 ppm Cu, 102 ppm Pb and 150 ppm Zn were obtained.

(c) Lone Pine Claim Gp. (Ste. Anne area)
(473213) 21 P/12E

This 9-claim group, 1 km west of Bathurst, was staked on the basis of gold analyses of pan-concentrated samples from well cuttings. Values reported were 0.7-5.14 g/t (0.02-0.15 oz./ton). In the vicinity of the gold showing, the host rock contains approximately 10% pyrite. Limited VLF EM and magnetometer surveys were reported.

(d) Portage Brook Claim (473141) 21 O/07E

The Portage Brook claim, located approximately 64 km west of Bathurst and 8 km south of First Portage Lake, may cover the extension of a mineralized horizon discovered to the southeast. Work reported in 1985 consisted of VLF EM16, and proton magnetometer surveys. The results are inconclusive; however, a weak conductor was outlined.

(e) Narrows Claim Gp. (473140) 21 P/05W

This group of 4 claims, located approximately 32 km southwest of Bathurst, is underlain by felsic and mafic volcanic rocks, gabbro, graphitic slates, and argillites of the Tetagouche Group. In 1985, a VLF EM16 survey outlined a westerly trending conductor.

(3) BP Resources Canada Ltd.

(a) West Wedge Property, M. L. 1368
(473138) 21 O/08E

The West Wedge property of 35 claims is located 70 km southwest of Bathurst. It is reached via Highway 430 and the Nepisiguit Road.

Work by BP Resources Canada Ltd. in 1984 consisted of deep overburden drill sampling, a lithogeochemical study, and gravity and Mise à la Masse surveys. Most of the work was focused on the bog zone, a small lens of high-grade zinc-lead-copper-silver-gold mineralization discovered in October of 1983. Drill hole WW-83-01 intersected 3.8 m of 12.84% Zn, 5.35% Pb. 0.78% Cu, 70.6 g/t (2.06 oz./ton) Ag and 1.3 g/t (0.038 oz./ton) Au.

The Mise à la Masse survey was conducted to delineate the sulphide body because other conventional (IP and MaxMin) methods had failed. Interpretation of the survey data suggests that a north-northwest-trending fault zone terminates and offsets the bog zone to the north.

Lithochemical sampling of 1982 and 1983 drill core was undertaken to identify geochemical trends in the host rocks near the massive sulphide horizon. Characteristic depletion of Na and Ca was discovered in the hanging wall and is recommended as a method of locating the offset position(s) of the bog zone.

The gravity survey did not delineate areas of significant density contrast within 60 m of the surface in the immediate area of the bog zone, but deep overburden sampling and follow-up surficial soil sampling defined five other areas worthy of study on the claims.

(b) West Wedge Claim Gp. (473183) 21 O/08E

The West Wedge claim group (122 claims) is located north of the original 35-claim group that became Mining Licence 1368 in 1984. This report deals with work done on 15 claims staked in the fall of 1984 and worked early in 1985. The West Wedge area is located approximately 60 km southwest of Bathurst and has been worked by several companies since 1953.

In 1985, the work consisted of linecutting, gravity, elevation, and electromagnetic surveys. A geochemical survey, comprising soil and overburden samples, was also carried out for base metals plus Mo, Ni, U, Mn, Fe, Ag, Co, As, Sb, Sn, Th, Cd, Bi, V, Ba, Sr, Al, Ca, Mg, K, Ti, P, La, and Cr.

The West Wedge area is underlain by rocks of the Tetagouche Group, consisting of quartzites interbedded with phyllites and a continuum of tuffaceous quartz wacke-siltstone-argillite (± graphite). Thick sequences of felsic volcanics comprise rhyolite, porphyritic to aphyric rhyolite tuffs, flows and dykes with minor breccias, and agglomerates. The mafic volcanics range from well-preserved amygdaloidal pillowed amygdaloidal pillowed varieties to highly tectonized chlorite schists. The massive stratiform lead-zinc-copper-silver sulphide bodies are generally hosted by the metasediments or felsic volcanics.

The results of the geophysical surveys have not outlined specific targets and none are recommended for drilling until supportive geologic or geochemical evidence can be found.

The geochemical results have defined two areas having potential for a massive sulphide occurrence. The zones appear to be aligned east-west, cutting across mafic and felsic units. The mineralization is believed to occupy a fault zone in the nose of a fold. BP recommends trenching across the anomalous zones, soil sampling along the mafic-felsic contact zone and gold analysis of soil samples with arsenic enrichment.

(4) Kidd Creek Mines Ltd.

(a) Falls Brook Claim Gp., Johnston Option (473195) 21 J/15E

The 20-claim Falls Brook property straddles the northeastern contact of the Dungarvon Granite in the Falls Brook area, 30 km north of Boiestown.

Previous B-horizon soil sampling by Billiton uncovered several Sn (3 to 4 times background) anomalies on the property. Mo-W values (up to 106 ppm and 20 ppm, respectively) were ten times background.

Mineralization on the property is of two types: (1) 10-50 cm thick milky quartz veins that cut fine- to medium-grained biotite granite and contain molybdenite, pyrite and minor wolframite. This type has only been found in boulders. (2) greisen style alteration around narrow (0.5-2.0 cm) pyrite-, chalcopyrite-, arsenopyrite-bearing quartz veins. Tin content ranges from 122 to 2300 ppm with an average value of 400 ppm.

Two hundred and six B-horizon soil samples were analyzed for Sn and W in 1985. Anomalous values of 16 ppm W and 68 ppm Sn were reported.

A proton magnetometer survey delineated a magnetic anomaly approximately 150 m in the up-ice direction from abundant greisen boulders. A weak VLF EM conductor was delineated but is reported to represent a clay or minor sulphide-bearing fault structure.

Values of 587 ppm Sn and 45 ppm W were obtained from some of the 17 trenches that were excavated.

(b) Dungarvon Claim Gp. (473175) 21 J/10E

This claim group, consisting of 50 claims, is located in Stanley Parish, York County, 9 km northwest of Hayesville. Most of the property is underlain by Devonian granite surrounded by hornfels.

In the 1982 programme, 51.6 km of grid line was surveyed radiometrically to differentiate rock types beneath overburden. Of 2134 soil samples collected, 1111 samples were analyzed for Sn, Cu and F. An additional 210 soil samples were analyzed for Sn in areas previously found to have high Sn values in soils. Analysis of Cu and F in soils produced disappointing results, especially since fluorite-copper mineralization is common. A hard layer of ferricrete found in trenches is thought to be the cause of these results. A total of 51.6 km of line was surveyed with a proton magnetometer. Readings were relatively flat, except in a small area to the northeast where volcanics outcrop. A VLF EM survey over the same lines revealed a number of very weak conductors trending 130°, presumed to represent clay and minor sulfide-filled fractures. A follow-up IP survey outlined chargeability highs that are correlated with pyrite-bearing mafic volcanics. The resistivity map shows a linear low trending 80° across the northern half of the grid. The significance of the results is not discussed.

(c) Trout Lake Extension Claim Gp. (473224, 437242) 21 J/10E

This group of 33 claims was staked in February and June of 1985 to cover a number of tin anomalies in tills along the Trout Brook granite-hornfels contact and over an outcrop of greisenized granite. The claims are located 9 km west of Hayesville.

The property is predominantly underlain by the medium- to coarse-grained biotite granite phase of the Trout Brook Granite. Much of the core of the pluton is medium-grained, two-mica granite. The outer rim that is in contact with Ordovician sediments is either a two-mica granite or a quartz-muscovite-rich greisenized equivalent.

In 1985, 348 B-horizon soil samples were collected and analyzed for Sn and W (19 samples were analyzed for F). Two parallel anomalies with greater than 30 ppm Sn measured 800 x 70 m and 500 x 30 m. The trend of these anomalies (120°) is roughly parallel to the orientation of greisen zones mapped on the adjacent Trout Lake claim group.

A total of 6.2 km of line was surveyed with IP, magnetometer and VLF EM instruments. The IP survey delineated a broad zone of coincident chargeability and resistivity (30-150 m wide), reflecting the mineralized (disseminated sulphide) rim of the pluton. Twelve narrow anomalies trending 295° to 305° were trenched, and revealed greisen-style mineralization. Anomalies that were not trenched also have coincident tin anomalies in soils. The IP method was highly effective in locating the mineralized zones, whereas the magnetic survey delineated the granite-sediment contact. VLF EM conductors correspond to narrow sulphide zones, faults, and alteration zones (sericite/kaolinite).

Approximately 900 m of trenching was conducted on the property, 85% of which exposed bedrock. Tin mineralization occurs in: (1) moderately greisenized and sulphide-bearing granite in contact with sediments; (2) intensely greisenized zones; and (3) in feldspar, quartz, quartz-feldspar and quartz-chalcedony-fluorite-kaolinite veins.

Type (1) mineralization has not been found in bedrock. Boulders of this type assay 155-1521 ppm Sn. Evenly disseminated arsenopyrite, pyrite, sphalerite, chalcopyrite and bornite occur in these samples; the broad IP anomaly is believed to be caused by such mineralization.

Intensely greisenized zones occur in the contact phase of the granite, which is altered to coarsely crystalline muscovite ± quartz ± alkali feldspar. Zones are 0.1-5.0 m in width. Cassiterite is the major accessory mineral with lesser amounts of wolframite, molybdenite, beryl and sulphides. Assays returned values up to 4.9% Sn from this type of mineralization. The vein-type mineralization (3) is subdivided on the basis of mineralogy. Feldspar veins carry the most significant amounts of tin (0.055% Sn over 2.7 m, 0.29% Sn over 1.45 m). Quartz-feldspar veins are less abundant; one sample assayed 0.92% Sn. Greisen-bordered quartz veins and quartz-chalcedony-fluorite-kaolinite veins are narrow (30 cm-0.3 m wide) and low grade (50-266 ppm Sn).

(d) Four Mile Brook Claim Gp. (473171) and Four Mile Brook Property, M. L. 1378 (473243) 21 J/10E

This 25-claim group is located in Stanley Parish, York County, 25 km north of Hayesville. Three drill holes were put down in 1984. Further trenching was recommended to help delineate additional drill targets.

In 1983, trenches 18 and 19 were excavated in the southern section of the property in the vicinity of mineralized granite boulders. Trench 18 revealed silicified pyritic granite with background metal content. Trench 19 uncovered a 1.5 m wide cassiterite-bearing vein directly below an area of mineralized boulders. Assays from the latter vein were not reported.

In 1984, nine trenches were excavated in two areas, and three drill holes were put down to test a feldspar-cassiterite vein. One of the trench samples assayed 31.06% tin over 10 cm. Each drill hole cut the feldspar-cassiterite vein hosted by coarse- to medium-grained granite. The best intersections were as follows:

Drill Hole No.	Interval (m)	Thickness (m)	Sn (%)
FMB-1	19.86 - 20.29	0.43	0.22
	27.72 - 27.87	0.15	4.07
	28.12 - 28.37	0.25	0.23
	28.83 - 28.95	0.12	0.44
	29.30 - 29.50	0.20	0.73
	81.52 - 81.57	0.05	0.60

Drill Hole No.	Interval (m)	Thickness (m)	Sn (%)
FMB-2	26.82 - 27.04	0.22	0.42
	47.05 - 47.17	0.12	0.26
FMB-3	66.94 - 67.06	0.12	0.44
	85.51 - 85.61	0.10	0.95

Two trenches (85-40, 85-41) were completed in 1985. Mapping of trench 85-40 revealed minimal sulphide mineralization, a 2-3 m wide stockwork zone composed of one 2 cm feldspar vein cut by several 1 cm quartz veins. Assays of six trench samples yielded 18-71 ppm Sn. The higher Sn assays are from feldspar veins and greisenized joint surfaces. Trench 85-41 exposed granitic till and weathered bedrock.

(e) Halfmile Lake Property, M. L. 998
(473241) 21 O/08W

The Halfmile Lake sulphide deposit, discovered by Texas Gulf Sulphur in the mid-1950s, is located 67 km northwest of Newcastle and 18 km west of the Heath Steele mine. The deposit occurs in polydeformed and metamorphosed rocks of the Tetagouche Group. The sulphides occur in an overturned metavolcanic-metasedimentary sequence that dips 55° north. The ore reserves are estimated to be 10 160 640 t grading 0.17% Cu, 2.6% Pb, 7.51% Zn and 30.9 g/t (0.9 oz./ton) Ag, and 907 200 t grading 2.0% Cu.

The 1985 exploration programme was carried out to determine the surface extent and near-surface gold content of the gossan zones over the massive sulphide deposit. Gossan zones were systematically trenched across the stratigraphy. Sufficient gossan material was exposed to assess the gold and silver potential. The mean gold value is 0.456 g/t, thirteen trench sample assays were above 1.250 g/t Au, and four of those were above 2.044 g/t Au. The mean silver assay is 14 g/t. Eight trench samples contained more than 36 g/t Ag and four of those contained more than 58 g/t Ag. It was recommended that the property be held in good standing.

(5) **Lacana Mining Corporation Ltd.**

(a) California Lake Claim Gp. (473185) 21 O/08E

Prospecting in the California Lake area led to the discovery of altered rocks containing appreciable arsenopyrite, and a boulder of silicified breccia also containing arsenopyrite plus sphalerite and stibnite. Assays of this boulder yielded up to 1783 g/t (52 oz./ton) Ag, and 2.1 g/t (0.06 oz./ton) Au. A large claim group (113 claims) was staked to cover the discovery area, located 40 km southwest of Bathurst.

The 1984-1985 programme consisted of prospecting, trenching, VLF EM and magnetometer surveys. A 35 km grid was cut and picketed.

Bulldozer trenching of this site revealed a mineralized zone hosted in a sequence of interbedded rhyolite tuffs and lavas, which generally strike north-south. The rocks are schistose and have a variable sulphide content. Assays up to 617 g/t (18 oz./ton) Ag over 15 m were obtained in the eastern portion of the trench.

Geophysical surveys (VLF EM, magnetometer) outlined prominent and coincident anomalies that do not appear to be associated with mineralization. Follow-up geophysical interpretation, detailed geological mapping, and soil sampling is recommended.

(6) A. J. O'Donnell

Restigouche Claim Gp., (473199) 21 O/09W

This 33-claim group is 64 km west of Bathurst in the vicinity of the Eighteen Mile Brook-Upsalquitch Lake area. It is underlain by poorly exposed volcanic and sedimentary rocks of the Tetagouche Group. Work filed for 1985 by Granges Exploration Ltd. comprised two diamond-drill holes totalling 41.5 m and a 5328 km horizontal loop EM survey.

DDH-R-8 intersected graphitic schist with narrow sections of heavy pyrite. At a depth of 46 m, DDH-R-9 intersected a pyritic zone, 3.5 m thick, in phyllite and graphitic schist. The assay results were not reported.

The electromagnetic survey indicates three untested anomalies that warrant diamond drilling.

(7) Granges Exploration Ltd.

Indian Lake-Strachens Lake Claim Gp.
(473240) 21 O/08W

This 30-claim group, staked in 1985, is approximately 50 km southwest of Bathurst. Previous work by Brunswick Mining and Smelting Corporation Limited comprised diamond drilling, geological, geochemical and geophysical surveys.

A MaxMin EM survey was reported in 1985. Known anomalies were confirmed and a new, untested anomaly was identified. Diamond drilling is recommended in the new zone.

(8) J. C. Pitre

Roche Long Lac Claim Gp. (473222) 21 P/04W

This 3-claim group is approximately 10 km southeast of the Heath Steele mine. Work in the 1950s by American Metals outlined a body of disseminated sulphides within an extensive envelope of alteration.

Ninety-one soil samples were collected and assayed for Cu, Pb, Zn and Ag. Scattered high assays were 1620 ppm Pb, 1150 ppm Zn, and 4 ppm Ag.

(9) Kennco Explorations (Canada) Ltd.

Murray Brook Property, M. L. 1180
(473239) 21 O/09W

The Murray Brook sulphide deposit is located approximately 80 km west of Bathurst. The deposit is one of more than 30 polymetallic massive sulphide bodies outlined in the 1950s. Northumberland Mines Ltd. optioned the property from Kennco Explorations (Canada) Ltd. in 1985 and is primarily interested in the precious metal content of the gossan.

The recovery of Au and Ag from the gossan was thought to be more viable because of the current value of Au, the anticipated low mining costs, and improved heap-leach technology.

Kennco's minimum gossan reserve is approximately 334 800 t averaging 3.45-4.39 g/t Au and 117.6-250.0 g/t Ag. Core recovery averaged 90-100% in 36 diamond-drill holes (1172.3 m). The gossan deposit, as outlined by drilling, covers a surface area of 154-246 m, whereas its depth is 15.4-41.5 m. Also of interest is a massive, chalcopyrite-rich, pyrite layer directly beneath the gossan. Previously, Kennco reported an intersection of 11 m of 15% Cu.

The following is a summary of the best intersections obtained by Northumberland Mines Ltd.:

Drill Hole No.	Thickness (m)	Au (g/t)	Ag (g/t)
NM 1	18.15	1.882	110.07
NM 2	6.46	2.038	275.97
NM 3	23.08	1.035	87.81
NM 4	6.77	0.784	37.95
NM 5	12.15	0.941	46.10
NM 9	31.69	1.568	86.55

Further development of the deposit is pending recommendations of a prefeasibility study and results of metallurgical testing.

(10) Northeast Exploration Services Ltd.

Moose Brook Claim Gp. (473238) 21 O/01E

The 1985 exploration programme comprised prospecting, and proton magnetometer and soil geochemical surveys aimed at defining the extent of an iron formation. The soil assays revealed only weak anomalies. An outcrop of iron formation could not be traced using the magnetometer data, and additional magnetometer work on the iron formation outcrop was suggested.

(11) Esso Minerals Canada Ltd.

Middle River Claim Gp. (473247) 21 P/12W

This 72-claim group is located in the Middle River area of the Bathurst mining district. Previous work located a transported gossan hardpan of unknown source, massive sulphide float, and a combined As-Sb stream sediment anomaly. Several drill holes contained narrow intersections of copper mineralization. Work filed for 1985 comprised soil geochemical, VLF EM, MaxMin, and proton magnetometer surveys on a small portion of the property. Arsenic anomalies in soils are associated with geophysical anomalies. One weak Au anomaly was also found. The source of the As anomalies and the sulphide mineralization are to be investigated.

(12) John Duncan

Pabineau Claim Gp. (473177) 21 P/05E, W

This property consists of 46 contiguous claims located 15 km south-southwest of Bathurst. Highway 430 and the gravel road to Pabineau Lake provide access to the area.

The property is underlain by Devonian granite that intrudes sedimentary and volcanic rocks of the Tetagouche Group. Government reports dating back to 1932 recorded an assay of 5.02% MoS_2 in a prospect in this area. Recent interest stems from the discovery of massive sulphides in float grading 3.10% Cu, 0.39% Pb, 0.17% Zn, 188.6 g/t (5.50 oz./ton) Ag, and 0.24 g/t (.007 oz./ton) Au along a 9 m section of a recently excavated road cut.

Work performed on the property included soil and till sampling, geological prospecting, and a reconnaissance VLF EM survey; however, the results are not reported.

Mr. Duncan states that extensive geochemical and geophysical surveys will be performed on the property to define drill targets. Further investigations into the molybdenite occurrence will be carried out to define fracture systems and alteration horizons that may host gold and/or base metal mineralization.

(13) Anaconda Canada Exploration Ltd.

(a) Armstrong 'A & D' Property,
M. L. 1017 (473148) 21 O/09E

A gravity survey was performed in selected areas over the Armstrong 'A' and 'D' sulphide zones, which are located about 27 km west of Bathurst. The Armstrong 'A' zone was detected over a strike length of 396 m with a maximum Bouguer anomaly amplitude of 1.8 mgal. A single continuous horizon is interpreted to be present, rather than two separate sulphide zones as was previously interpreted. A weak (0.1 mgal) anomaly with a width greater than 122 m was detected over the Armstrong 'D' occurrence.

(b) Armstrong 'B' Property,
M. L. 1100 (473147) 21 O/09E

The Armstrong 'B' property covers a low-grade, pyritic, zinc-lead-copper deposit hosted by southerly trending, schistose, felsic, tuffaceous rocks of the Tetagouche Group. In 1985, a gravity survey indicated a weak correlation between a Bouguer anomaly and the previously known electromagnetic anomaly. Another Bouguer anomaly of greater amplitude was also located but has not been completely explained.

(c) McMaster Property, M. L. 1037 (473146) 21 O/09E

The McMaster property is located approximately 40 km west of Bathurst. Conventional ground geophysical surveys and a limited amount of diamond drilling indicated a small sulphide zone. Exploration data filed for 1985 consisted of a gravity survey (4 lines) that delineated a Bouguer anomaly. It correlates with the electromagnetic anomaly associated with the sulphide horizon. The profiles indicate that the zone is along a northeast-striking geological contact between two units of different densities. Since the eastern and western extent of the anomaly is not known, additional surveying may be warranted.

(d) Orvan Brook Property,
M. L. 1213 (473145) 21 O/09E

The Orvan Brook claim group is located approximately 32 km west of Bathurst. Conventional ground geophysical surveys and a limited amount of drilling have indicated a small sulphide zone. Exploration in 1985 consisted of a gravity survey (4 lines) that produced a Bouguer anomaly. It correlates with the electromagnetic anomaly associated with the sulphide horizon. Further work is warranted.

(14) **Billiton Canada Limited**

(a) CNE Claim Gp. (473180) 21 P/05W

A soil sampling programme was conducted over this 27-claim group that is located 40 km south-southwest of Bathurst. The highlight of activity in this area was the discovery of a small sulphide (CNE) deposit in 1978. In 1985, 1124 B-horizon samples were analyzed for Cu, Pb, Zn and Ag along selected grid lines at 25 m intervals. One anomalous area is 75 m southwest of the sulphide zone and another is 800 m to the northeast. Dispersion patterns are believed to have been influenced by glacial and hydromorphic transport. Maximum values are 110 ppm Cu, 1600 ppm Pb, greater than 20 000 ppm Zn, and 2.9 ppm Ag.

(15) **Mactaquac Mining Ltd.**

(a) Hurd Lake Claim Gp. (473153) 21 J/10E

This 24-claim property is located approximately 20 km north-northwest of Boiestown on the Northumberland-York county border. The property is at, or near the top of, the western margin of the Carboniferous Dungarvon Granite.

In 1983 Mactaquac Mining Ltd. collected a panned silt sample from a small brook flowing out of Hurd Lake. It yielded 8000 ppm Sn. In follow-up work, nine samples of panned concentrates from 25 kg stream-sediment samples yielded as much as 8000 ppm Sn, 250 ppm W, and 632 ppm Pb.

The 1984 programme involved collection of nine till samples throughout the property. The best results were reported from the eastern section where three samples assayed 850, 560 and 315 ppm Sn. These tills are associated with altered granites and quartz veins containing wolframite.

Some of the 132 soil samples, taken mostly from the B-horizon, contained up to 80 ppm Sn. Higher values are expected from samples collected in the eastern part of the property.

(16) K. D. A. Whaley

(a) Kagoot Brook Claim Gp. (473143) 21 O/02E

The Kagoot Brook property, consisting of 20 claims, is underlain by Cambro-Ordovician felsic volcanic and sedimentary sequences, in part intruded and altered by a Devonian granite. The property is 25 km east-northeast of Serpentine Lake.

Two hundred and sixty-seven soil samples were collected from the B-horizon, sieved (-80 mesh), and tested for Cu, Pb, Zn, Ag, and Co. The soil sampling survey results outlined two anomalies. One weak anomaly (65 ppm Zn, 57 ppm Pb, 45 ppm Cu, 1.2 ppm Ag and 6 ppm Co) is associated with a weak response from the VLF EM survey. It is also parallel to the contours from the magnetometer survey. The second anomaly (59 ppm Pb, 65 ppm Zn, 99 ppm Cu, 4.3 ppm Ag, and 58 ppm Co) is roughly parallel to a magnetic trend to the north. There are also VLF EM responses associated with the magnetic anomaly. VLF EM responses elsewhere in the area may represent graphitic zones in tuffaceous sequences. A more detailed survey to verify electromagnetic conductors is recommended.

(b) Headwaters Claim Group (473142) 21 O/02E

The Headwaters property, consisting of 21 claims, is 25 km northeast of Serpentine Lake. The area is underlain by Ordovician felsic volcanic and sedimentary sequences. Interest in the area was generated by anomalous results obtained from a regional geochemical silt sampling survey conducted by the New Brunswick Department of Natural Resources. The aim of the programme was to determine the mineral potential of this area by comparing it to the zinc-lead-silver-copper model of the known Cambro-Ordovician metal deposits.

No significant responses were obtained from an 11 km proton magnetometer survey, and only weak and inconclusive responses were obtained from an 11 km VLF EM survey.

In a soil geochemical survey, B-horizon samples were assayed for Cu, Pb, Zn, and Ag. Two anomalies were delineated. One is anomalous in Zn (180 ppm), Pb(120 ppm), Ag (4.2 ppm) and Cu (40 ppm). This soil anomaly has roughly the same shape as the magnetic contours and the VLF EM response indicates the existence of a possible conductor. The other anomaly is composed of variable base metal contents (up to 160 ppm Pb, 25 ppm Cu and 3.2 ppm Ag). The magnetic response coincides with the shape of the soil anomaly, the VLF EM response is inconclusive with respect to the strike of a favourable horizon. This anomaly occurs outside favourable geologic units, and is considered to be of lower priority.

A more detailed geophysical survey is recommended to verify electromagnetic conductors, since the geological setting is favourable for massive sulphides.

(17) **Durham Resources Inc.**

Red Rock Claim Gp. (473151) 21 J/16W

In 1984, this group of 14 claims was staked over the Red Rock lead-copper-zinc prospect. It is located on both sides of the Plaster Rock-Renous Highway, where the South Branch of the Renous River crosses the road approximately 56 km west of Renous.

VLF EM results showed weakly conductive zones that probably represent the Catamaran Fault and associated shear zones. The magnetometer survey results were relatively flat. An interesting gravity profile was reported near a sulphide showing (L8E).

Soil samples taken at selected locations on the grid system showed anomalous tin and base metal values. Rock samples had anomalous Au and Ag values (assays not reported).

Trenching was recommended on the property to find the cause of Sn anomalies and the gravity high near the sulphide showing on L8E.

(18) **Miramichi Lumber Company Limited**

Napadogan Lake Property, M. L. 1306
(473107) 21 J/07W

This claim group is 1 km north of Napadogan and about 80 km northwest of Fredericton. The area is underlain by Cambrian-Ordovician greywacke and slate. Anomalous amounts of Zn, Mo, Ag and Sb were found in the area. Proton magnetometer, EM16 and MaxMin EM surveys were conducted on the property to assist in delineating the possible source of the metallic anomalies.

EDMUNDSTON, AROOSTOOK-MATAPEDIA AND TOBIQUE-CHALEUR ZONES

(1) Brunswick Mining and Smelting Corporation Limited

(z) Stephens Brook Claim Gp. (473204) 21 P/12W

This group of 53 claims is located 9 km west of the village of Nigadoo. Two mineral occurrences on the property are the Beresford copper deposit and the Stephens Brook arsenopyrite-gold showing. The Stephens Brook showing, discovered in the 1880s, carries significant amounts of gold; grab samples have assayed up to 17.1 g/t (0.5 oz./ton) Au. Previous geochemical and geophysical surveys by Brunswick Mining and Smelting Corporation Limited outlined anomalies warranting further investigation. The 1985 field programme consisted of additional VLF EM and geochemical coverage, and trenching of the interesting targets.

Trenching of geophysical and geochemical anomalies 200 m west of the main showing led to the discovery of a gold-arsenopyrite vein having a width of 0.5 m and a strike length of 75 m. The average grade is 3.22 g/t (0.094 oz./ton) Au. The vein has a northeasterly trend and dips 55-60° to the northwest. Wallrocks are bedded Silurian siltstones (porcellanite), which carry 2-5% disseminated arsenopyrite and a few thin seams of massive arsenopyrite. These rocks strike east-west and dip steeply to the north. The use of mercury as a pathfinder element for the area proved to be ineffective in both B-horizon soil geochemical and buried-cup mercury detector surveys.

Arsenic, copper and gold content in B-horizon samples are the most effective for pinpointing mineralization. Further work (geophysics and diamond drilling) was recommended to test VLF EM conductors and IP anomalies west of Stephens Brook. The main showing at Stephens Brook was not drilled.

(1) Brunswick Mining and Smelting Corporation Limited

(aa) Ramsay Brook Claim Gp., Project 4B14
(473221) 21 O/10E

The Ramsay Brook claim group (223 claims) is located 68 km due west of Bathurst. The 12 claims in the centre of the property are the subject of this report. A 19.4 km grid was cut on the group.

Geological mapping revealed a large granodiorite-gabbro pluton that intrudes blue-grey and black Silurian siltstones and limestone in the west and northwest portion of the grid. Lower Devonian(?) conglomerate underlies the extreme southeast corner of the grid. An area of rusty, pyritic, calcareous siltstone was found on the northeast edge of the grid, but no significant Au assays were obtained from rock samples in this area.

The east-northeast-trending Murray Brook Fault, traceable through the northern section of the grid, appears to be the major structural control for a gold prospect approximately 4 km east-northeast of the property.

The VLF EM survey outlined the Murray Brook Fault and related splays, while a magnetic survey outlined the extent of the granodiorite-gabbro intrusion in the western portion of the 12 claims.

A soil geochemical survey (2017 samples from the B-horizon) revealed strong association between arsenic soil anomalies (up to 67 ppm) and major VLF EM conductors. The gold content of the soils is not reported.

Detailed prospecting and rock sampling was recommended north of the grid in the areas underlain by calcareous siltstone.

(bb) Nigadoo Gold Claim Gp., Project 4278 (473158) 21 P/12W

This 83-claim group is located approximately 24 km northwest of Bathurst. Previous work, including trenching, drilling, and stream, soil and till sampling, has indicated the presence of concentrations of Pb, Zn, Cu, Au and Ag. Work filed for 1984 comprised linecutting, geological mapping, soil sampling, VLF EM and IP surveys in the southeast part of the block.

Geological mapping defined two Silurian rock units, a northerly, highly fissile, grey-green, calcareous slate-phyllite, and a southerly, grey to black, slightly calcareous siltstone with light green siliceous layers that carry minor disseminated pyrite. The area lies on the north limb of a northeasterly trending synform. Trenching has exposed a 2 m wide siliceous zone with pyrite and chalcopyrite mineralization. Massive sulphide boulders (pyrite, chalcopyrite and sphalerite) were found at one site.

Approximately 1050 soil samples were collected. Maximum assays were 3820 ppm Pb, 2006 ppm Zn, 756 ppm Cu, and 14.8 ppm Ag. No significant gold assays were reported from the soils.

Two strong and several weak northwest-trending VLF EM conductors were located. IP surveys on three lines also defined these conductors, which are probably caused by northwest-trending shear and fault zones.

(cc) Patapedia Property, M. L. 1186 (473205) 21 O/14W

The Patapedia property is located approximately 3 km north of the junction of the Patapedia and Restigouche rivers in Restigouche County. This property has received extensive exploration since 1965, when it was recognized as a sizeable calc-silicate alteration zone.

A total of 294 B-horizon soil samples were collected in search of polymetallic gold-bearing veins expected to occur in north-northeast-trending faults and linears. Gold anomalies were not found, but a number of base metal anomalies were outlined.

(5) **Lacana Mining Corporation Ltd.**

(b) Shingle Gulch Claim Gp. (473176) 21 O/03E

This group of 18 claims was staked in August of 1984 to cover the discovery of a boulder comprising massive sulphides in rusty chlorite schist. Samples yielded up to 10 500 ppm Cu, 8400 ppm Pb, 7050 ppm Zn and 68 g/t (2 oz./ton) Ag. The property is situated 33 km northeast of Plaster Rock. The area has been searched since the mid-1950s for massive sulphides by McIntyre, Keevil, Amoco and Canadian Occidental Petroleum. Canadian Occidental had investigated part of the Lacana property, and exposed a mineralized zone that assayed 0.014% Cu, 0.38% Pb, and 0.356% Zn over a width of 1.5 m. The gossanous zone is within a unit of diabase that has intruded shale and fissile siltstone.

The 1984 programme consisted of prospecting, trenching, and geologic mapping, magnetometer and VLF EM surveys. Weak VLF EM conductors are interpreted to have overburden sources. The magnetometer survey outlined intrusive-sediment contacts but gave no indication of mineralized zones.

Soil sampling and detailed mapping have been recommended to trace the mineralized float to its source.

(19) **Michael Smith**

(a) Smith Option, Project 4B12 (473258) 21 O/9W

This group of 30 claims was staked and recorded by Michael Smith in September of 1984. Brunswick Mining and Smelting Corporation Limited optioned the property in late 1984 and renewed the claims in 1985. The property is approximately 4 km east of the Upsalquitch River and 2 km due north of the Road to Resources, approximately 64 km west of Bathurst. Work done in 1985 consisted of reconnaissance soil geochemical, geological, VLF EM, and magnetometer surveys. Approximately 2035 soil samples were taken at 20 m intervals and analyzed for Au, Ag, Cu, Pb, Zn, and As. The soil geochemical survey indicated a localized zone of moderate to strong anomalies for Pb, Zn, As, and Cu in the area between grid lines 30E 5+00N and 47E 0+65N. Several northeasterly trending fracture zones (part of the Murray Lake Fault zone) were defined by the VLF EM survey. No distinct magnetic anomalies are apparent.

Outcrop is sparse over most of the grid area and restricted primarily to road cuts and the sides of steep hills. No significant mineralization was found, although some rusty blocks of angular float (siliceous metasediment) assayed up to 0.31 g/t (0.009 oz./ton) gold.

(b) Simpson's Field Claim Gp.,
Smith Option (473167) 21 O/10E

This 54-claim group is approximately 50 km due west of Bathurst on the Southeast Upsalquitch River. The area is underlain by Upper Silurian clastic sediments, and younger volcanics and intrusive rocks of uppermost Silurian and Lower Devonian age. Rio Algom Exploration Inc., who optioned the property, filed the 1985 report. The 1985 programme comprised linecutting, deep overburden sampling, trenching, geological mapping, and VLF EM16, IP, ground magnetometer and B-horizon soil sampling surveys.

Investigation of the best showing confirmed gold enrichment in heavily oxidized, sheared, and brecciated siltstone. Hematite, limonite, and hydrous manganese oxides are common; remnant pyrite is present in a few places. Quartz and calcite veins are prominent. Significant gold assays were obtained from trenches in the main showing (average 1.3 g/t Au over 12 m), but gold content was much lower on extensions (0.34 g/t Au over 8 m).

Prospecting did not reveal additional evidence of gossan or sulphide mineralization. Deep overburden and soil sampling outlined gold anomalies only over the known showing. The detailed IP survey outlined a weak anomaly coincident with the mineralized zone and a second anomaly to the north; low sulphide contents are indicated, even though these features are of reasonable width. The magnetometer survey detected a low over the showing. Positive magnetic trends were shown to be on or near diabase dyke outcrops. VLF EM conductivity appears to be concentrated in a 300-400 m wide zone that includes the area of the showing. Several VLF EM trends are influenced by or are the result of topographic variation. The option has been terminated and the claims transferred back to Smith.

(20) **Wayne Carroll**

Ramsay Brook Claim Gp., Carroll Option,
Project 4B13 (473259) 21 O/10E

The 6-claim property is located 68 km due west of Bathurst, approximately 1.5 km west of the Southeast Upsalquitch River and about 1 km north of the Road to Resources. The claims lie along the Murray Brook Fault, which appears to be the major structural control related to a new gold prospect (Michael Smith gold prospect).

The 1985 programme included 19.4 km of linecutting, VLF EM, and magnetometer surveys. The property is underlain by folded Silurian conglomerates, siltstones and limestones, and minor diabase dykes. A VLF EM survey indicated a north-northwest-trending anomaly attributed to conductivity along the Murray Brook Fault. A magnetometer survey outlined the mafic intrusive rocks. Approximately 530 B-horizon soil samples were collected and assayed for gold and arsenic, but the results were not reported.

(21) Tintina Mines Ltd.

Campbell River Claim Gp. (473254) 21 O/02W

The 96-claim property is located 64 km northeast of Plaster Rock. The claims were staked to cover an area where stream sediment samples yielded anomalous gold assays.

The 1985 programme involved more detailed geological, VLF RADEM, magnetometer, and stream sediment, rock, soil, and humus sampling surveys. The area is underlain by rocks of the Tobique Group, comprising felsic and mafic volcanics, slates and metasiltstones.

Stream sediment and rock sampling revealed few gold assays above background. Although erratic, anomalous gold assays were found in soil and humus samples (up to 81 ppb, and 70 ppb, respectively); the greater anomalies were closely associated with VLF RADEM anomalies. The erratic distribution is thought to be due to depth of overburden and subsurface drainage. Diamond drilling has been recommended.

(22) Lac Minerals Limited

Mt. Costigan Property, M. L. 1260
(473131) 21 J/14E

The report filed in 1985 describes the results of 1985 drilling. The mineralization (Zn-Pb-Ag-Au) is in a breccia pipe within Devonian rhyolite (Open File Report 85-2). The five holes were drilled to further delineate the mineralized mass at depth. The pipe may have originated from magma similar to that producing the Redstone Mountain Granite, 3 km to the east. Granite that is estimated to occur 1 km below the pipe may contain tungsten-tin-copper mineralization.

The best assays from the two drill holes that intersected significant mineralization are summarized below:

Hole No.	Interval (m)	Thickness (m)	Pb (%)	Zn (%)	Cu (%)	Au (g/t)	Ag (g/t)
LCO 84-2	94.75- 96.0	1.25	0.28	3.50		0.2	1.71
	96.0 - 97.0	1.5	0.40	5.40		0.3	6.86
	97.5 - 99.0	1.5	0.45	1.10			3.43
	99.0 -100.5	1.5	1.22	2.70			5.14
	100.5 -102.0	1.5	0.86	3.00			1.71
	102.0 -103.5	1.5	0.84	1.18			
	103.5 -105.0	1.5	0.004	0.17			
		10.25	0.59	2.41			2.72

Hole No.	Interval (m)	Thickness (m)	Pb (%)	Zn (%)	Cu (%)	Au (g/t)	Ag (g/t)
LCO-84-3	171.92-172.3	0.44	0.52	1.06			
	203.45-204.00	0.55	0.53	0.72	0.86		3.43
	205.95-207.00	1.05	0.79	1.67	0.84		6.86
	207.00-208.50	1.5	1.04	1.58	1.98		8.57
	208.50-210.00	1.5	1.01	0.98	1.60		5.14
	210.00-211.50	1.5	1.46	2.60	1.40		6.85
		5.55	1.10	1.71	1.50		6.85
	215.2 -216.0	0.8	0.75	2.15	0.91		5.14
	216.0 -217.5	1.5	0.49	1.99	1.15		5.14
	217.5 -219.0	1.5	0.96	4.40	0.42		10.29
		3.8	0.73	2.98	0.81		7.17

(23) Upper Kent Lime Works Limited

M. L. 1326 (473189) 21 J/12E

This small operation, located 16 km south of Perth-Andover, supplies agricultural lime to local farmers.

ELMTREE SUBZONE

(1) Brunswick Mining and Smelting Corporation Limited

(dd) Hickey/Cady Option, Project 4B16
(473201) 21 P/13W

The Hickey/Cady Option comprises 52 contiguous claims and one mining licence (2 claims). Application is being made for a mining licence on an additional 5 claims. The property is located 2 km north of the village of Alcida, approximately 20 km northwest of Bathurst. The area has received fairly constant exploration since the late 1950s, primarily for base metals. Work by Canadian Nickel stemmed from a gold discovery by Mr. Owen Hickey. It comprised 89.3 m of diamond drilling (4 holes) in the immediate vicinity of a gold showing, and soil geochemical, magnetometer, geological, and VLF EM surveys on adjoining claims. Lack of geophysical and geochemical targets and dissappointing drilling results terminated Canadian Nickel's interest. Discovery of significant gold mineralization on Lacana's ground to the south renewed interest in the claims.

The property is underlain by highly deformed Ordovician sediments of the Elmtree Group. The rocks strike northeasterly in the vicinity of the gold showing and generally dip between 55° and 75° to the northwest.

The 1985 field season focused on the known Au showing. Trenching was undertaken to determine if the auriferous zone had any structural controls. Three trenches exposed a gossan 15 m long in a mafic intrusive(?) - phyllite/ porcellanite skarn contact. An attempt to expose the gossan along strike was partly successful. No distinct structural control was evident. Channel samples approximately 3 m apart returned assays of 2.16 g/t (0.063 oz./ton) Au over 0.89 m, 8.02 g/t (0.234 oz./ton) Au over 3.00 m, 4.59 g/t (0.134 oz./ton) Au over 1.8 m, and 5.28 g/t (0.154 oz./ton) Au over 1.40 m.

In the southwest corner of the claim group, a soil sampling survey was carried out to check for any offset of the Lacana zone as indicated on Mineral Resources Division maps. The survey indicated a broad, easterly trending, arsenic anomaly with a strike length of 1500 m. Soils with high zinc (209-558 ppm) and silver assays occur nearby. No gold anomalies were found. Further exploration on the property has been recommended.

(2) Norman Pitre

(f) Green Point Claim Gp. (473188) 21 P/13W

This property, located in the Point Verte (Green Point) area, consists of 5 claims that were staked in October of 1985. Interest in this property is based on work performed here in the late 1960s, when narrow arsenopyrite veins were found in Fournier Group metabasalts and metagabbro. The veins carry copper, lead, zinc, silver and gold.

The 1985 programme consisted of VLF EM, proton magnetometer, MaxMin, and soil geochemical surveys. Mr. Pitre concluded that two new VLF EM conductors warrant further investigation.

(5) Lacana Mining Corporation Ltd.

(c) Elmtree Brook Claim Gp. (473178) 21 P/13W

This group of 97 claims was staked to cover strike extensions of showings discovered as a result of prospecting and trenching in the Alcida area, 21 km northeast of Bathurst.

The most significant mineralization described in this report was in the 'discovery zone'. It consists of veins of semimassive arsenopyrite with sphalerite, galena and stibnite that assayed 17.1 g/t (0.5 oz./ton) Au and 524.6 g/t (15.3 oz./ton) Ag. Work filed in 1985 consisted of geological and geophysical survey results. A soil sampling programme was also conducted during the same period, but the data were not filed. Lacana reported that B-horizon samples are an extremely effective medium for pinpointing mineralization (especially gold and arsenic).

Trenching in the 'discovery zone' uncovered a number of narrow veins within two zones, ranging in thickness from 0.6-4.6 m. The zones occur within slates (graphitic in part) and phyllites of the Ordovician Elmtree Group. The best assay obtained was 12.0 g/t (0.350 oz./ton) Au and 382.6 g/t (11.16 oz./ton) Ag over a sampling width of 0.6 m. The veins trend east-west, paralleling a well-defined, steeply north-dipping foliation that is developed in the sediments. Channel sampling results were not reported from the five trenches. A major east-west fault has been mapped just to the south of the showing. It marks the contact between the polydeformed Elmtree Group sediments and Chaleur Group conglomerates (Silurian).

Magnetic data shows a strong high in the northeast, which correlates with a known mafic volcanic unit. A much weaker high (+400 gamma contrast) lies 762 m west and south of the 'discovery zone', and is flanked by a magnetic low. Subsequent work has shown this subtle magnetic feature to be a mineralized and altered phase of gabbro ('west gabbro zone'). No information on this zone was filed even though press release data indicated the zone to be the most important. Two prominent VLF EM trends parallel the east-west trend of the geology and shearing. These features reflect graphitic units and/or fault zones. The upper trend passes through the 'discovery zone' and the 'west gabbro zone'. The lower trend lies approximately 152 m south of the known showings. A MaxMin II survey revealed numerous, less well defined conductors of similar orientation.

The company has now embarked on its third drilling campaign and is outlining an important gold occurrence in the 'west gabbro zone'. The mineralization there is apparently more significant than the vein setting in the 'discovery zone'. The 'west gabbro zone' is characterized by sheared and altered gabbro. Grades are typically 3.4-6.8 g/t (0.1-0.2 oz./ton) Au over core lengths of up to 24 m.

(24) **M. I. Watson**

Elmtree River Claim Gp. (473206) 21 P/13W

In December of 1984, a group of 24 claims was staked in the Madran area east of the Alcida gold showing in Elmtree Group sediments. B-horizon soil samples were collected over the entire claim group along pace-and-compass lines spaced 122 m apart. Results of the analyses are not reported.

(25) **Heron Mines Limited**

(a) Belledune Property, M. L. 1328 (473230) 21 P/13W

This property, 4 km south of Belledune, is adjacent to Mining Licence 1320 that is also held by Heron Mines Limited. Although a reconnaissance soil sampling programme was carried out over most of Heron's holdings, this report describes results from 28 samples taken along a single survey line. No significant Cu, Pb, Zn or Au anomalies were detected. The area is underlain by Fournier Group basalts and gabbros.

(b) Belledune Property, M. L. 1320 (473179) 21 P/13W

This large tract of ground is 4 km south of Belledune and is adjacent to Mining Licence 1155, which hosts the Turgeon massive sulphide occurrence. This report describes linecutting and soil sampling conducted on the eastern half of Mining Licence 1320. Cu, Pb, Zn and Au analyses are reported for 343 B-horizon samples. No significant anomalies are evident from the reconnaissance survey. The property is underlain by Fournier Group basalts and gabbro.

MAGAGUADAVIC ZONE

(26) **Shediac Bay Resources Inc.**

Zealand Station Claim Gp. (473228) 21 J/02W

The Zealand Station prospect is near Zealand Station, north of the Saint John River and 35 km northwest of Fredericton.

The area is underlain by Silurian clastic sedimentary rocks that are intruded and metamorphosed by the Middle Devonian Pokiok Batholith. A thin, fine-grained, pegmatitic chilled margin was recognized in the intrusion. The granite is intensely sheared, and altered to muscovite and clay minerals.

Two areas were trenched. Samples collected from the trenches were analyzed for beryllium and selected samples for gold, copper, lead and zinc and rare earth elements. BeO assays ranged from below the detection limit to 0.098%. One pyrite-rich sample assayed 6.80 g/t Au. Results of a magnetic survey conducted on the property suggest that the sulphide-rich zone extends at least 700 m westward, indicating that further exploration is warranted.

ST. CROIX ZONE

(27) **Highbourne Explorations Limited**

Letang Claim Gp. (473091) 21 G/02W

This property is between the villages of Letang and Back Bay, about 8 km south of the Town of St. George. The area is underlain by Silurian, intensely deformed, mafic and felsic volcanic rocks, pelitic metasediments and mafic intrusive rocks. Small amounts of copper were produced from the Wheal Louisiana and Oliver Cameron mines around the turn of the century.

Interest in the area has been renewed in recent years because of its gold potential. A soil geochemical survey conducted by Highbourne Explorations Limited confirmed the presence of gold on the property. The geology of the property was mapped and magnetic and VLF EM surveys were carried out. Several anomalies were delineated. Seven short holes were drilled by the company to test the electromagnetic anomalies; only one 15 cm, silicified, pyrite-rich core sample assayed 99 ppb Au.

(28) **Mascarene Mines Limited**

St. George Claim Gp. (473149) 21 G/02W

This claim group is about 4 km south of the Town of St. George near Letang. The area is underlain by intensely polydeformed Silurian, mafic volcanic and sedimentary rocks. Veins and disseminations of chalcopyrite, pyrrhotite and minor sphalerite and galena occur near the sheared contact between the volcanic and sedimentary rocks. Interest was revived in the area because copper-rich samples from the ore dump of the 'old Oliver Cameron mine' yielded up to 24 g/t (0.7 oz./ton) gold.

Mascarene Mines Limited conducted magnetic and VLF EM surveys on the property during 1984. Soil sampling was carried out over the anomaly during 1985. Moderate Cu, Pb, Zn and Ag anomalies were delineated in the northwestern part of the property and some scattered anomalies were outlined elsewhere. Anomalous gold assays range from 10 to 24 ppb.

(29) **Appalachian Resources, Inc.**

Blueberry Mountain Claim Gp. (473150) 21 G/03E

Appalachian Resources, Inc. conducted a soil geochemical survey for Cu, Zn, Pb and Au over its claim group in the mafic and felsic intrusive rocks of the western Saint George Batholith. The area was originally staked for its gold potential, which was indicated by a strong arsenic anomaly detected in stream sediments from the area. The anomaly probably reflects arsenopyrite-bearing quartz-carbonate veins that cut the intrusive complex. A soil sampling programme defined an anomalous, northwest-trending, gold-arsenic zone. Anomalous gold assays from this zone ranged from 9 to 42 ppb Au.

(30) **Morton Gordon**

(a) St. Stephen Nickel Claim Gp. (473252) 21 G/03W

The St. Stephen nickel deposit was restaked by Morton Gordon because of its potential as a possible platinum prospect. Recent remapping by the Geological Survey of Canada distinguished peridotite, troctolite and olivine gabbro as the major rock types in the St. Stephen Complex. Anorthosite is a minor unit and norite occurs in a few localities, but its original texture and mineralogy have been obliterated. Both Morton Gordon and the Geological Survey of Canada investigations found small amounts of platinum associated with the sulphide deposits that occur in the northern half of the intrusion.

(14) Billiton Canada Limited

(b) Mount Pleasant Property, M. L. 1255
(473114, 473216) 21 G/07W

Mount Pleasant is about 35 km north of the Town of St. George in Charlotte County. In 1985, the company reported on a deep hole (535 m) that was drilled from an access drift in the mine to probe the granitic rocks below the tungsten orebody. Numerous sections showing intense alteration effects characterized by albite, quartz, chlorite, fluorite and topaz were found. An extensive breccia with topaz, fluorite and chlorite was intersected between 482.5 and 507.5 m.

A 251.5 m hole, drilled on Hornet Hill, intersected metasediments, massive silicified rock, highly altered granite and stockwork-veined granite. Minor amounts of molybdenite, bismuth, pyrite, arsenopyrite, sphalerite and galena were found in the core.

(31) Sullivan Resources Ltd.

Little Mount Pleasant Property,
M. L. 1312 (473215) 21 G/07W

Little Mount Pleasant is about 2 km southeast of the peak of Mount Pleasant and about 40 km north of the Town of St. George. The property is underlain by Carboniferous felsic volcanic rocks similar to those at Mount Pleasant. Previous exploration by Sullivan Mines Limited consisted of an induced polarization survey and follow-up drilling of the strongest anomalies. In 1985, 144 soil samples were collected and analyzed for 31 elements as a further aid to drill-target selection. Strong Sn, Mo, Bi and Sr anomalies (5-10 times background for tin, 408 for bismuth, and 2-4 for molybdenum) in the western part of the claim group are encouraging. Manganese content in this area is low, suggesting that this anomaly reflects metallic minerals in underlying bedrock.

(32) Maritime Resource Research Limited

(a) Bauld Hill Claim Gp., West Extension (473174,
473198) and North Extension (473173) 21 G/09E

The claim group is about 2 km east of the Village of Wickham and 40 km north of the City of Saint John. The 'western extension' claim group was staked to cover extensions of anomalies found in the original Bauld Hill group. The area is underlain by Silurian sedimentary, and felsic and mafic volcanic rocks, which are intruded by mafic and felsic stocks and dykes. Hematite-rich quartz veins are locally abundant. The company laid out a survey grid on the 'western extension' and mapped the geology. A hole was drilled in the 'north extension' across an electromagnetic conductor. The conductor was found to reflect a wide graphitic slate zone with local concentrations of arsenopyrite and pyrite. Drilling conducted by the company in 1985 did not delineate metallic mineral concentrations of economic interest, but the presence of zones of intense rock alteration was encouraging.

(b) Sheba Claim Gp (473197) 21 H/13E

Maritime Resource Research Limited conducted an exploration programme on its claim group near the settlement of Goshen, about 10 km north of the Town of Sussex in Kings County. The area is underlain by intensely deformed, Late Silurian mafic and felsic volcanic rocks and metasediments. Two holes were drilled on the property to determine the extent of sulphide minerals, but no economic deposit was delineated.

(22) Lac Minerals Limited

(b) Annidale Claim Gp. (473132) 21 H/13W

This property is about 20 km northwest of the Town of Sussex in Kings County. The area is underlain by Late Silurian mafic volcanic and sedimentary rocks that are intruded by gabbro and diorite of the Middle Devonian Stewarton Complex.

Two types of deposits have been found: (1) an intensely deformed stratiform copper deposit referred to as the 'old Dick mine' and (2) an epigenetic type associated with the Stewarton Complex that contains lead, zinc and copper sulphides with silver minerals and traces of gold. Chrome mica, carbonate and silica are the typical alteration minerals associated with the epigenetic deposit. The company cut a grid on the property, conducted magnetic and VLF EM surveys and mapped the geology in detail. A limited amount of diamond drilling also was carried out on the property.

(33) Derek Brown

Jake Lee Brook Claim Gp. (473134) 21 G/02E

The Jake Lee Brook prospect is north of the Village of Pennfield and about 50 km west of the City of Saint John. The area is underlain by intensely deformed Silurian mafic and felsic volcanic rocks and metasediments. These rocks are intruded by Mississippian granite of the eastern Saint George Batholith in the northern part of the property and by gabbro and diorite farther to the south. Geochemical analyses of silt samples and rock chips were continued to delineate areas of economic interest on the prospect.

CALEDONIA ZONE

(34) Kinbauri Gold Corporation

(a) North Head Claim Gp. (473196) 21 B/15

This claim group is at North Head on the north end of Grand Manan Island. The area is underlain mainly by mafic flows and tuff, and gabbro intrusions. Carbonatized and chloritized rocks occur in several localities. In 1980, a multielement analysis of 46 rock samples from the area was undertaken. Above normal amounts of Cu, Pb, Zn, Fe, V, Mn, Sb, Au and, in places, Se and Te were found. Anomalous gold was detected in two rock samples in the southeast corner of the claim group where assays for Sb and other elements are high.

(b) Roach Creek Claim Gp. (473115) 21 G/01W

This claim group extends from the Chance Harbour area, along the Bay of Fundy coast into the Dipper Harbour area. The oldest rocks in the claim group are mafic and felsic volcanic rocks of the Late Precambrian Coldbrook Group. The Coldbrook Group rocks are intruded by granite porphyry and diabase of Devonian or older age. Carboniferous limestone and clastic sedimentary rocks unconformably overlie the volcanic and intrusive rocks.

Quartz veins occur locally in shear zones in the volcanic rocks. The host rocks adjacent to the veins are silicified, epidotized and carbonatized. Pyrite occurs in varying amounts in the altered rocks. Geochemical analyses of humus over two of the altered shear zones yielded anomalous values between 12 and 19 ppb Au. Background values are less than 2 ppb Au.

(c) Chance Harbour Claim Gp. (473130) 21 G/01

This claim group extends from Chance Harbour eastward along the Bay of Fundy coast. The bedrock units in this area are similar to those in the Roach Creek area (473115).

Several altered zones characterized by the presence of carbonate, silica and chlorite are exposed in the area. Pyrite, chalcopyrite, malachite and hematite occur within and along quartz veins. Anomalous amounts of gold were first detected in humus samples that were collected in 1984. In 1985, a multi-element rock geochemical investigation was undertaken. Samples from an intensely altered zone in the southern part of the claim group, near Haleys Cove, contained anomalous amounts of gold (up to 79 ppb Au). Above normal amounts of other elements in this zone include Mo (4-24 ppm), Cu (7-216 ppm), Pb (6-93 ppm) and As (7-34 ppm). Si, Sb, Ag, Fe and Co are also in excess of average crustal abundances.

(30) Morton Gordon

(b) Golden Grove Claim Gp. (473227) 21 H/05W

This claim group covers the Golden Grove graphite prospect about 25 km east of Saint John. The graphite is associated with a fault zone in metasediments of the Green Head Group immediately north of the Golden Grove Intrusives. The graphite zone appears to have a maximum width of about 2 m and the highest grade material contains 30-38% carbon. VLF EM and magnetometer surveys indicate a strike length of about 350 m.

(c) Millican Lake Claim Gp. (473223, 473162)
and Millican Lake East (473172) 21 H/04W

This claim group borders the southeast shoreline of Millican Lake, about 15 km southeast of Saint John. The area is underlain by Precambrian or younger granite and granodiorite that are unconformably overlain by Cambrian or younger clastic sedimentary rocks similar to those at Cape Spencer. Quartz veins are abundant in the property.

Fourteen rock samples were collected and analyzed for gold. Assays ranged from a trace to 2.79 g/t (0.08 oz./ton) Au. B-horizon soil samples from the western part of the property were analyzed for gold. The gold contents of these samples ranged from below the detection limit to 77 ppb. Pan concentrates taken from the eastern part of the property yielded assays from below the detection limit to 17.5 g/t (0.51 oz./ton).

(d) West Beach Claim Gp. (473190,473214) 21 H/04W

This claim group is 8 km northeast of the Cape Spencer gold deposit and 18 km southeast of the City of Saint John, along the Bay of Fundy coast. The oldest rocks in the area are mafic volcanic and sedimentary rocks of the Late Precambrian Coldbrook Group that are thrust over Cambrian or younger, highly deformed metasediments. The metasediments are in faulted contact with Precambrian or younger granite. The granite is intensely sheared, argillitized, sericitized and silicified. Small amounts of gold (0.69-2.79 g/t) occur in hematite-rich quartz veins associated with a northeast-striking fault that cuts the granite. Sixteen samples collected from these veins during 1985 by Gordex Minerals Ltd. contained 179-993 ppb Au and one sample assayed 3.8 g/t (0.11 oz./ton) Au.

(35) **Newbrun Resources Ltd.**

(a) Gooseberry Cove Property, M. L. 1354
(473163, 473209) 21 G/01W

This claim group is along the west side of Musquash Harbour, about 20 km southwest of the City of Saint John. The area contains Precambrian or younger gold-bearing and base-metal-sulphide-bearing granite porphyry that intrudes Precambrian granodiorite. The granodiorite intrudes Precambrian carbonates of the Green Head Group and mafic and felsic volcanic and sedimentary rocks of the Coldbrook Group.

The company mapped the geology of the property, conducted magnetic and VLF EM surveys and collected soil samples for geochemical analyses. A distinct anomaly defined by a cluster of relatively high gold and base metal assays occurs in the northern part of the claim group. Anomalous gold assays (up to 135 ppb Au) are probably related to the altered granite porphyry. Isolated anomalous values, ranging between 108 and 171 ppb, were detected farther south in the claim group. These values are probably related to thin gold-bearing quartz veins that occur locally.

(b) West Musquash Harbour Claim Gp.
(473193, 473098, 473194) 21 G/01W

The West Musquash Harbour claim group covers a Precambrian or younger granite porphyry and diabase dykes on the west side of Musquash Harbour, about 16 km west of Saint John. The granite porphyry and diabase dykes intrude Precambrian granodiorite. The granodiorite intrudes Precambrian carbonates of the Green Head Group and mafic and felsic volcanic and sedimentary rocks of the Coldbrook Group. Base metal sulphides and gold occur locally as disseminations and fracture coatings in the granite porphyry. Assays ranging from 3.8-35.3 g/t (0.11-1.03 oz./ton) Au have been reported from coastal outcrops.

The 1985 field work included geological mapping, trenching and sampling along a grid established in 1984. Some low-grade base metal sulphides were found in four trenches, but only trace amounts of gold were detected.

(36) **Peter Fenety and Paul Burke**

(a) Musquash Harbour Claim Group (473231) 21 G/01W

This property is at the head of Musquash Harbour about 16 km west of Saint John. The ground was optioned by Rex Silver Mines Ltd.

The area is underlain mainly by Precambrian or younger granodiorite, quartz diorite and granite that are unconformably overlain by Carboniferous clastic sedimentary rocks. Diabase dykes are locally abundant. Some of the granitic rocks are intensely fractured, sericitized, silicified and carbonatized. Pyrite, chalcopyrite, bornite, galena and hematite are common in these rocks.

During 1985, the property was prospected in detail, parts were blasted at two sites to expose fresh rock and a soil sampling programme was carried out. Seventy rocks samples were assayed for gold, copper, lead, zinc and silver. Anomalous gold assays were obtained from soil samples taken near Five Fathom Hole to the west and east of the Musquash River (10-96 ppb Au), in the Five Fathom Hole area (12-345 ppb Au), and from the southern part of the claim group (13-273 ppb Au).

(37) **Mark McNamara**

(a) Balls Lake Claim Gp. (473108) 21 H/04W

This claim group is south and west of Balls Lake, about 12 km southeast of Saint John. The area is underlain by Carboniferous sandstone and conglomerate. Prospecting, trenching, and till sampling were carried out on the claim group. Anomalous gold values ranging from 277 to 720 ppb Au were found immediately adjacent to Balls Lake.

(38) H. C. McNamara

(a) Cape Spencer Claim Gp. (473112, 473235) 21 H/04W
(Millican Lake area)

The Millican Lake prospect is about 1 km northeast of Cape Spencer and joins the Gordex claim group. The oldest rocks in the area are Late Precambrian, highly deformed, mafic volcanic and clastic sedimentary rocks that are intruded by granitic rocks of Late Precambrian or younger age. The granitic rocks are unconformably overlain by Carboniferous or older, intensely deformed, arkosic conglomerate and sandstone that are similar to the rocks in the main gold-bearing zone of the Gordex property.

An extensive quartz stockwork intrudes the granitic and overlying arkosic rocks. Adjacent to the quartz stockwork zone, trenching revealed gold-bearing pyritiferous, argillitized rocks, similar to those on the Gordex property. Prospecting, trenching, and rock, soil and till sampling were continued on the claim group. Two areas yielded anomalous gold assays.

(b) Cape Spencer Property, M. L. 1347 (473234)
(Millican Lake Area) 21 H/04W

The Millican Lake prospect is about 1 km northeast of Cape Spencer and joins the Gordex claim group. The oldest rocks in the area are Late Precambrian, highly deformed, mafic volcanic and clastic sedimentary rocks that are intruded by granitic rocks of Late Precambrian or younger age. The granitic rocks are unconformably overlain by intensely deformed arkosic conglomerate and sandstone of Carboniferous or older age, similar to the rocks in the main mineralized zone of the Gordex property.

Southeast of Millican Lake, an extensive quartz stockwork intrudes the granite and overlying arkose. Along the southern margin of this quartz stockwork zone, gold-bearing pyritiferous rocks similar to those on the Gordex property, have been discovered by trenching.

Prospecting, soil sampling, panning and trenching were conducted over the altered gold-bearing zones. Soil samples were panned for gold on-site. Trenches were located in areas where pan concentrates yielded abundant fine gold grains.

(1) Brunswick Mining and Smelting Corporation Limited

(ee) Shanklin Claim Gp. (473117) 21 H/05E

This claim group is about 35 km east of Saint John in the Shanklin area. The northern part of the claim group is underlain by altered rhyolite and the southern part consists mostly of mafic flows. The only significant metallic anomaly detected on the ground was from a soil sample that contained 210 ppb gold.

(15) Mactaquac Mining Ltd.

(b) Vernon Mines Claim Gp. (473121) and
Martin Head Claim Gp. (473139) 21 H/11E

These claim groups are along the Bay of Fundy coast, 50 km southeast of Sussex. The prospect includes the old Vernon copper mine that was worked around the turn of the century. The ground was staked because of previously reported gold values. A programme of geologic mapping, prospecting, trenching, rock chip sampling and VLF EM surveying was conducted on the properties. The highest gold value intersected in drill holes (4) was 274 ppb over 10 m. Sampling of pyrite-rich, argillitized and sericitized samples yielded assays of 100-300 ppb Au, 200-600 ppm Cu and 0.3-11.7 ppm Ag in areas delineated by a silt sampling programme. Quartz-carbonate veins in the vicinity of the old mine contain 3-4% Cu, 102 ppm Ag and up to 3000 ppb Au.

(39) J. Newhouse

Sinclair Hill Claim Gp. (473136) 21 H/10W

This claim group is about 25 km north of Alma, a village on the Bay of Fundy coast. Late Precambrian felsic volcanic rocks are the most abundant in the area. Within this sequence is a cream- to rust-coloured tuff that contains up to 30% pyrite. A gossan zone exposed in a gravel pit in these rocks contains disseminated pyrite and chalcopyrite. Five trenches excavated in this gossan zone contain up to 230 ppb Au.

(40) J. A. Roy McIntyre

Stuart Mountain Claim Gp. (473127) 21 H/15W

The Stuart Mountain prospect is about 14 km northwest of Albert-Riverside, immediately south of the Turtle Creek and Prosser Brook roads. The area is underlain by mafic and felsic volcanic and sedimentary rocks of the Late Precambrian Coldbrook Group. The prospect was staked for its gold potential but no significant gold assays have not been reported.

CARBONIFEROUS PLATFORM

(1) Brunswick Mining and Smelting Corporation Limited

(ff) North Branch Lake Claim Gp.,
Project 232 (473210) 21 P/05E

The 46-claim property is located approximately 26 km south of Bathurst. In 1985, a 16.5 km grid line was cut, and magnetometer and gravity surveys were completed. Drilling to determine the source of a gravity anomaly intersected only barren mafic intrusive(?) rock in the Ordovician basement under approximately 150 m of Pennsylvanian sediments.

(gg) Smokers Brook Property, M. L. 1367, Project 207 (473244) 21 P/04W

The Smokers Brook property consists of 105 claims situated 27 km northwest of Newcastle. The surveyed area was extended to the north in 1984 through a programme of linecutting, and electromagnetic, magnetometer, and gravity surveys. A weak electromagnetic anomaly in the northern portion of the surveyed area may represent increased sulphide content in mafic rocks. No new gravity and magnetic anomalies were located.

(hh) Cold Branch Brook Property, M. L. 1353, Project 220 (473186) 21 P/05E

Mining Licence 1353 is located approximately 26 km south of Bathurst, adjacent to Key Anacon's Property (M. L. 1287). The bedrock comprises flat-lying or gently dipping Pennsylvanian sediments overlying steeply dipping Ordovician rocks. Previous work outlined a large, northerly trending, linear, magnetic anomaly and a broad, northerly trending, gravity anomaly. Work filed for 1985 includes linecutting, and magnetic, gravity, and electromagnetic surveys in the eastern portion of the property.

The magnetic survey revealed no new anomalies but showed an overall decrease in the magnetic field to the northeast of the magnetic high outlined in the 1980 survey.

The gravity survey showed that the anomaly outlined in 1980 continues to decrease to the east and north.

The electromagnetic survey was carried out at frequencies of 1777, 444, and 222 Hz with 183 m coil separation. The 444 and 222 Hz frequencies outlined a large conductor in the Ordovician basement parallel to, and slightly west of, the large magnetic anomaly. Other anomalies were weak to very weak.

(ii) West Cold Branch Claim Gp., Project 228 (473137) 21 P/05E

This 19-claim group is situated 2 to 3 km southeast of the Key Anacon shaft, approximately 20 km south of Bathurst. Little work had been done previously on the claims. Seven holes, drilled by United Montauban in 1953, did not intersect significant sulphides. The work reported in 1985 consists of linecutting, MaxMin EM, proton magnetometer and gravity surveys.

A small magnetic anomaly in the centre of the property may be due to deformed Ordovician rocks that are unconformably overlain by flat-lying Pennsylvanian sedimentary rocks. A drill hole was recommended to test this anomaly.

The MaxMin EM survey outlined several anomalies believed to originate in Ordovician basement rocks. The gravity results, although incomplete, indicated several weak anomalies coincident with these conductors.

(jj) Gordon Meadow Brook Property, M. L. 1359, Project 222 (473187) 21 P/05E

This group of claims, located approximately 20 km south of Bathurst, is attached to the southern boundary of the Key Anacon property (M. L. 1287). Work reported in 1985 comprises three drill holes (1688 m) put down to test coincident gravity and magnetic anomalies. In this area, flat-lying Pennsylvanian sediments unconformably overlie folded Ordovician sediments, mafic pillow lavas and tuffs, and felsic tuffs and tuffaceous sediments. Analytical results were disappointing; however, hole 222-1 intersected a 1.5 m section that assayed 2.7 g/t (0.08 oz./ton) Au. The host rock appears to be a brecciated, chloritic, pyritic, and cherty magnetite iron formation. This unit may be repeated at a higher level in the same hole and in hole T-2 put down by N. A. Timmins (1954).

(41) **Sharpe Energy & Resources Ltd.**

Canobie Claim Gp. (473166) 21 P/11W

This 36-claim property is accessible by Highway 11 from Bathurst east to Janeville, and then southeast from Janeville to Highway 340.

The property was staked as a follow-up to a 1984 gravity survey. Between September 1984 and July 1985, work on the property consisted of drilling, linecutting, gravity and magnetometer surveys. An east-west-trending gravity anomaly coincides with a weak to moderate magnetic anomaly. A borehole electromagnetic survey (hole C-4) was inconclusive. Basalts within the predominantly sedimentary sequence are the source of coincident magnetic and gravity anomalies.

Continued reconnaissance work was recommended to the south and southwest toward the Pabineau granite contact and Key Anacon deposit.

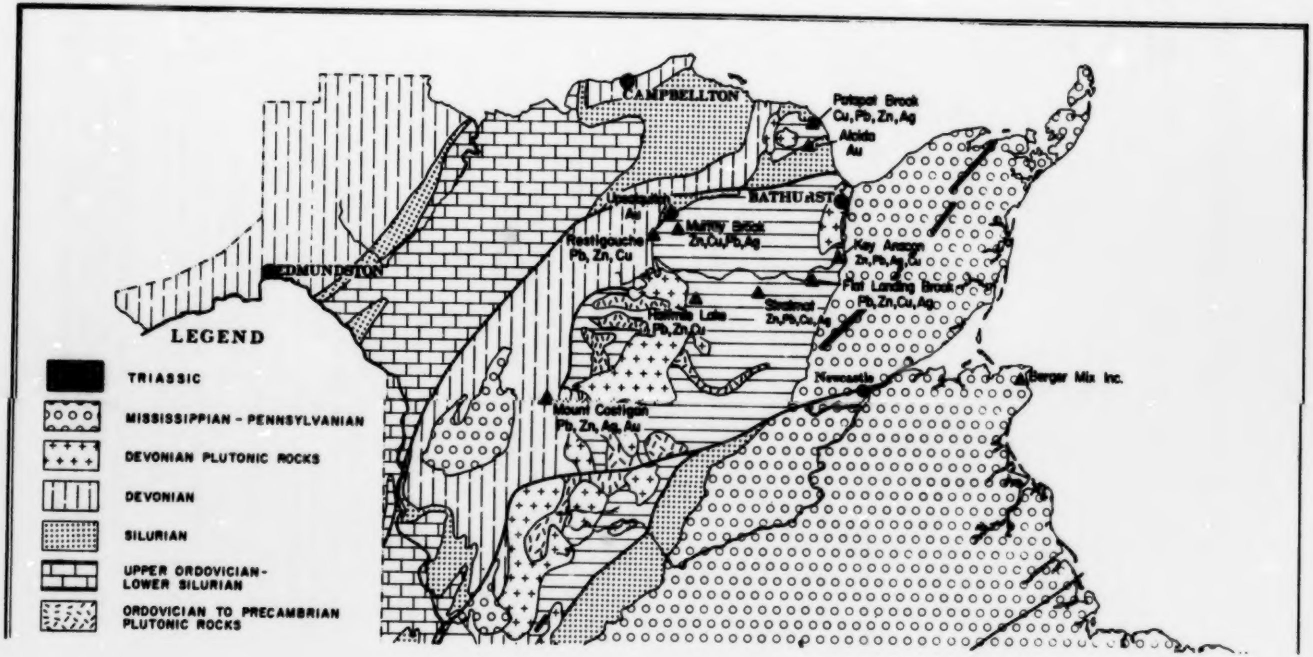
MINERAL OCCURRENCES [2,3]

The mineral occurrences described below are those which have been worked on in 1985 (Figure 17). For the properties described in previous issues of this report, only the additional information is provided here.

Alcida Gold Deposit 21 P/13W

LOCATION The property is located 21 km northwest of Bathurst, in the Alcida-Dauversiere area (Figure 17). (Lat. 47°46.5'N; Long. 65°52'W)

COMPANY Lacana Mining Corporation (Exec. Office) 1702, 150 King St. W., P. O. Box 19, Toronto, M5H 1J9 (30%), Murphy Oil Co. 1700, 800 6th Avenue SW, Calgary T2P 3Y3 (22.5%); Oakwood Petroleum Ltd., 1800, 311 6th Avenue SW,


CAMPBELLTON
Patapat Brook
Cu, Pb, Zn, Ag
Alcida
Au
BATHURST
Upsalquitch
Au
Murray Brook
Zn,Cu,Pb,Ag
Restigouche
Pb, Zn, Cu
Key Anacon
Zn,Pb,Ag,Cu
Flat Landing Brook
Pb,Zn,Cu,Ag
Stratmat
Zn,Pb,Cu,Ag
Half Mile Lake
Pb,Zn,Cu
Mount Costigan
Pb, Zn, Ag, Au
Newcastle
Berger Mix Inc.
EDMUNDSTON
LEGEND
TRIASSIC
MISSISSIPPIAN - PENNSYLVANIAN
DEVONIAN PLUTONIC ROCKS
DEVONIAN
SILURIAN
UPPER ORDOVICIAN-
LOWER SILURIAN
ORDOVICIAN TO PRECAMBRIAN
PLUTONIC ROCKS

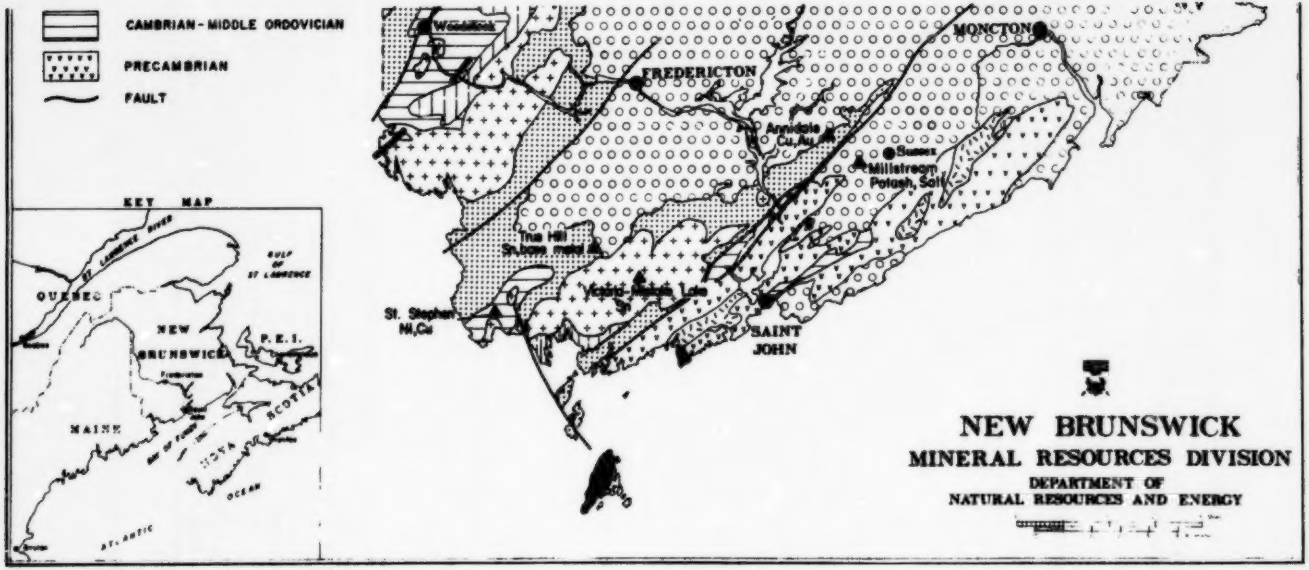

CAMBRIAN-MIDDLE ORDOVICIAN
PRECAMBRIAN
FAULT
KEY MAP
QUEBEC
ST LAWRENCE RIVER
GULF OF ST LAWRENCE
NEW BRUNSWICK
P.E.I.
MAINE
NOVA SCOTIA
BAY OF FUNDY
ATLANTIC
OCEAN
Woodstock
FREDERICTON
MONCTON
Annidale Cu,Au
Sussex
Millstream Potash, Salt
Tria Hill Sn,base metal
Victoria-[illegible] Lake Sn
St. Stephen Ni,Cu
SAINT JOHN
NEW BRUNSWICK
MINERAL RESOURCES DIVISION
DEPARTMENT OF
NATURAL RESOURCES AND ENERGY

Figure 17. Metallic and nonmetallic mineral occurrences in New Brunswick.

Calgary T2P 3H2 (22.5%); Sparton Resources Inc., 500, 67 Richmond St. W, Toronto, M5H 1Z5 (18.5%); Lynx-Canada Explorations, 520, 25 Adelaide St. E., Toronto, M5C 1Y2 (6.5%). Chief Geologist - A. Lee Barker.

HISTORY The initial discovery that aroused interest in this area was made by George Murphy, who was investigating an area selected by the New Brunswick Prospecting Syndicate. Electromagnetic, magnetic and soil geochemical surveys outlined anomalies over the original discovery ('discovery zone') and farther west in the 'west gabbro zone'. Trenching revealed gold- and silver-bearing mineralization in both zones. A number of holes have been drilled. Exploration costs are being paid by Lacana Mining Corporation, American Oakwood Energy Limited and Lynx Canada Explorations. Other small interests are vested in Acadia Mineral Ventures and Silver Sceptre Mines Limited.

GEOLOGY The 'discovery zone' comprises northwesterly trending sphalerite-pyrite-galena-stibnite-arsenopyrite veins and disseminations that cut polydeformed Ordovician (Elmtree Group) metasedimentary rocks. The mineralization occurs near a contact with less deformed Silurian (Chaleurs Group) sedimentary rocks. Chip samples from this zone assayed up to 5.1 g/t (0.15 oz./ton) Au and 118.6 g/t (3.46 oz/ton) Ag over 1.8 m. The mineralization in the 'west gabbro zone' comprises pyrite, marcasite, arsenopyrite and pyrrhotite as fracture fillings and disseminations in a highly altered and fractured metagabbro sill and/or dyke that intrudes the Elmtree sediments. The mineralized rocks have been traced for 260 m along strike, over a width of 18 m and to a vertical depth of 49 m. Some deeper holes indicate mineralization to a depth of 167 m. The gold content is variable, ranging from 2.1 to 5.5 g/t (0.06-0.16 oz./ton) Au over 18 m; however, narrower sections (1-2 m) assayed 6.9-13.7 g/t (0.2-0.4 oz./ton) Au.

RESERVES No estimate of reserves has been made.

PROPERTY & DEVELOPMENT The property comprises approximately 126 claims. Several trenches, and 22 drill holes were completed.

Annidale Copper-Gold 21 H/13W

LOCATION The Annidale copper deposit is about 2 km south of Annidale, Kings County (Figure 17).

COMPANY The property is presently held by M. J. Grant and W. G. Walton and is under option to Lac Minerals Ltd.

DEVELOPMENTS Some base metal sulphides accompanied by low grade gold values were intersected locally. Lac Minerals remains interested in the property and further work is planned.

For additional information see Information Circulars 83-2, 84-1 and 85-2.

Flat Landing Brook Sulphide Deposit 21 P/5W

LOCATION The Flat Landing Brook deposit is approximately 40 km southwest of Bathurst, Gloucester Co., and is accessible via Highway 430 (Figure 17). (Lat. 47°22.9'N; Long. 65°52.6'W).

COMPANY Sabina Industries Limited optioned the property to Brunswick Mining and Smelting Corporation Limited in 1980.

DEVELOPMENTS Brunswick Mining and Smelting Corporation Limited continued to drill the deposit. During 1985, special drilling techniques were used but the results have not been reported.

For additional information see Information Circular 83-2.

Halfmile Lake Lead-Zinc-Copper 21 O/8W

LOCATION The Halfmile Lake deposit is 19 km west of the Heath Steele mine, Northumberland Co. It is accessible via Highway 430 and secondary roads (Lat. 47°25'N; Long. 66°19'W) (Figure 17).

COMPANY Falconbridge now has controlling interest in Kidd Creek Mines Ltd.

DEVELOPMENTS In 1985, the company investigated the extent of the gossan on the deposit and its gold-silver content.

For additional information see Open File Report 82-31 and Information Circulars 83-2 and 84-1.

Key Anacon Zinc-Lead-Silver-Copper 21 P/5E

LOCATION The Key Anacon deposit is located 23 km south of Bathurst in Gloucester County (Figure 17). (Lat. 47°26.1'N; Long. 65°41.8'W)

DEVELOPMENTS R. R. Irrinki of the New Brunswick Department of Natural Resources, Geological Surveys Branch, has begun ore reserve estimations for this deposit.

For additional information see Open File Report 82-31.

Mount Costigan Lead-Zinc-Silver-Gold 21 J/14

LOCATION The Mount Costigan deposit is located about 10 km north of the Plaster Rock-Renous Highway and about 5 km west of Trousers Lake in Victoria County (Figure 17). (Lat. 46°58.8'N; Long. 67°2.2'W)

COMPANY Amoco Canada Petroleum is the owner of the property.

DEVELOPMENTS Lac Minerals Ltd. has dropped its option on the property.

For additional information see Information Circular 84-1 and 85-2.

Murray Brook Zinc-Copper-Lead-Silver 21 O/9W

LOCATION The Murray Brook deposit is located approximately 50 km west of Bathurst in Restigouche County (Figure 17). (Lat. 47°31.5'N; Long. 66°25.8'W)

DEVELOPMENTS Kennco (Canada) Exploration Co. optioned the deposit to Northumberland Mines Limited. Drilling has outlined 1 632 960 t of gossan averaging 1.34 g/t (0.039 oz./ton) and 45.6 g/t (1.33 oz./ton) Ag.

For additional information see Open File Report 82-31 and Information Circular 84-1.

Patapat Brook Copper-Lead-Zinc-Silver 21 P/13W

LOCATION The Patapat Brook deposit is located approximately 35 km northwest of Bathurst in Restigouche County (Figure 17). (Lat. 47°51.1'N; Long 65°51.2'W)

COMPANY The property is now held by N. Pitre.

For additional information see Open File Report 82-31 and Information Circulars 83-2, 84-1 and 85-2.

Restigouche Zinc-Lead-Copper Deposit 21 O/7, 10

LOCATION The Restigouche deposit is located about 60 km west of Bathurst in Restigouche County (Figure 17). (Lat. 47°30.2'N; Long. 66°33.5'W)

DEVELOPMENTS The property was optioned by Lincoln Resources in 1985.

For additional information see Open File Report 82-31 and Information Circulars 83-2, 84-1 and 85-2.

St. Stephen Nickel 21 G/03W

LOCATION The two main nickel-copper ore bodies are about 2 km north of St. Stephen, Charlotte County (Figure 17).

HISTORY The first nickel-copper sulphide showings were found in the St. Stephen area around 1870 and the area has been intermittently explored since that time. The most extensive development occurred between 1958 and 1960. The deposits were recently restaked by Morton Gordon (Gordex Minerals Ltd.).

COMPANY Mr. Morton Gordon is president of Gordex Minerals Ltd.

RESERVES AND GRADE Small amounts of platinum have been found in some samples.

DEVELOPMENTS No exploration was done on the property during 1985. Extensive diamond drilling was carried out during previous years and a three compartment shaft gives access to the main orebody. The Geological Survey of Canada is conducting a detailed study of the deposit as part of the Mineral Development Agreement. Representative drill cores are presently stored in a rented facility in St. Stephen, but this material will be transferred to the Geological Surveys Branch core storage building at Sussex.

Stratmat Zinc-Lead-Copper-Silver 21 O/8E

LOCATION The Stratmat deposit is 5 km northwest of the Heath Steele deposit and about 50 km southeast of Bathurst in Northumberland County (Figure 17). (Lat. 47°18'N; Long. 66°07'W).

DEVELOPMENTS R. R. Irrinki of the New Brunswick Department of Natural Resources, Geological Surveys Branch, has completed ore reserve estimation for the property.

For additional information see Open File Report 82-31 and Information Circulars 82-3, 84-1 and 85-2.

True Hill Tin, Base Metal 21 G/7W

LOCATION The True Hill property is situated about 3 km west of Mount Pleasant, Charlotte County (Figure 17).

COMPANY Mr. Morton Gordon is president of Gordex Minerals Ltd.

DEVELOPMENTS The deposit was staked by Gordex Minerals Ltd. in 1985.

For additional information see Open File Report 82-31 and Information Circular 83-2.

Victoria - Mistake Lake Tin 21 G/07W

LOCATION This tin-bearing mineralized zone is situated about 18 km southeast of Mount Pleasant, Charlotte County (Figure 17).

DEVELOPMENTS Billiton Canada Ltd. allowed the claims to expire and part of this ground was restaked by W. Hunter and W. Walton.

For additional information see Open File Report 82-31 and Information Circulars 83-2 and 84-1.

NONMETALLIC MINERALS[13, 14]

Tardif et Frère Inc. has dropped its Peat Exploration Licence for Bog 16; AMR Peat Inc. has applied for a Peat Exploration Licence for the same area (Figure 17). Satoturve Oy has applied for a Peat Exploration Licence for Bog 324N. Berger Mix Inc. was preparing the necessary documents to convert its Peat Exploration Licence to a Peat Lease.

BP Resources Canada Ltd. fulfilled the terms of its 1981 exploration agreement with the New Brunswick government and a Mining Lease was signed on July 29, 1985 covering 10 056 ha of the Millstream potash property, 10 km west of Sussex.

PEAT[14]

Berger Mix Inc.

COMPANY Berger Mix Inc., 121, R. R. #1, St-Modeste, Cté Rivière-du-Loup, Québec G0L 3W0. The President is Claudin Berger. Telephone: (418) 862-4462.

RIGHTS Peat Exploration Licence 85-1 (681 ha) on Bog No. 337, under the Quarriable Substances Act, Chapter Q-1, R.S.N.B. 1968.

LOCATION Bog No. 337 is adjacent to Hwy 117, 2 km north of St-Camille, Kent County (Figure 17).

HISTORY Berger Mix Inc. acquired the Peat Exploration Licence in 1985.

RESERVES AND GRADE 13.46 Mm^3 of surficial and 1.41 Mm^3 of humified peat on a total bog area as follows:

	Crown (ha)	Freehold (ha)	Total (ha)
Total Bog	680	1	681
> 1 m	413	0	413

DEVELOPMENT None in 1985.

POTASH/SALT[13]

Millstream 21 H/12

COMPANY BP Resources Canada Ltd. - Selco Division, 55 University Avenue, Suite 1700, Toronto, Ontario M5J 2H7. The general manager is J. Hainey.

RIGHTS 10 056 ha Exploration Agreement, under Section 15(2) of the Mining Act, Chapter M-14, R.S.N.B. 1973.

LOCATION This property is located about 4 km east of Apohaqui and 10 km east of Sussex, Kings County (Figure 17).

HISTORY A drill hole (Millstream No. 1), completed in 1973 by the Department of Natural Resources, penetrated about 12 m of potash-bearing salt at a depth of 915 m, before it was abandoned because of technical difficulties. In May 1980, the Province called for tenders for the right to explore and develop a salt-potash prospect at Millstream and five tenders were received. After careful evaluation, the Province awarded the rights to BP Exploration Canada Ltd., now BP Resources Canada Ltd.

Between 1981 and 1983, 11 drill holes and related geological studies were completed to investigate the property. Results were extremely encouraging; potash beds were intersected at depths between 950 and 1050 m.

PRESENT OWNERSHIP BP Resources Canada Ltd. - Selco Division.

RESERVES AND GRADE Anticipated tonnages and potash grades ranging from 20 to 30% K_2O are very encouraging.

PRODUCTION None.

DEVELOPMENT BP fulfilled the terms of its 1981 exploration agreement and successfully negotiated a Mining Lease with the New Brunswick government for this property (July 29, 1985).

Results from the surface drilling programme have been encouraging. However, BP will review market conditions and continue to seek a suitable partner before proceeding with the next phase of the project, which is shaft sinking and an underground exploration programme.

EMPLOYEES One.

ENERGY RESOURCES[10]

The partnership of Irving Oil Limited and Chevron Resources Canada Ltd. drilled four holes in the Moncton Subbasin in 1985, following the completion of a seismic survey in the early 1980s (ONG Onshore Licences to Search 80-1 to 80-29) (Figure 18). In the offshore area no further exploration took place in 1985.

Ranchman's Resources (1976) Ltd. et al. continued to hold ONG Onshore Licences to Search 83-1 to 83-3 until August of 1985 when they were cancelled due to insufficient work being done.

OIL SHALE[9]

Cartago Resources Ltd. 21H/15E

COMPANY Cartago Resources Ltd., 304 - 2466 West 3rd Avenue, Vancouver, British Columbia V6K 1L8. Telephone: (604) 732-1958. The President is Walter W. Storm and the Manager is Gunter Allmann.

RIGHTS Bituminous Shale Licence to Search L85-01 comprising 8998 ha. The licence is issued under the Bituminous Shale Act, Chapter B-4.1, R.S.N.B. 1976.

LOCATION Licences to Search L85-01 occupies an approximately rectangular area in Westmorland County between the Petitcodiac and the Memramcook rivers. The area includes the villages of Belliveau, Dover, Memramcook, St. Joseph and Taylor Village (Figure 18).

HISTORY Oil shales have been known in the Westmorland County area for over 100 years. In 1942, the Canada Department of Mines and Resources drilled seven core holes at Taylor Village totalling 320 m. In 1967 and 1968, the Atlantic Richfield Company drilled five exploratory oil shale holes in the Dover, St. Joseph and Taylor Village areas.

The area was held under a Bituminous Shale Licence to Search by Canadian Occidental Petroleum from 1974 to 1981. They carried out an oil shale mapping survey and reported assay work on numerous surface samples.

Petro-Canada held a Bituminous Shale Licence to Search in the Westmorland County area from 1981 to 1984. They drilled 963 m of core in three holes in the Dover and Boudreau Village areas.

EXPLORATION A modest proposal to carry out sampling and assay work on the Petro-Canada core has been submitted.

DEVELOPMENTS Cartago Resources Ltd., on the advice of its technical advisor, Bowman Engineering Associates Limited, has negotiated an agreement with Gemini Resources Inc. of Kentucky to retort oil shales in its Gemini Hot Oil Bath process. The Gemini process is based on a small-scale modular approach to shale oil exraction that seems appropriate to New Brunswick's resource.

OIL AND NATURAL GAS[10]

Chevron Canada Resources Ltd.

COMPANY Chevron Canada Resources Ltd., 500-Fifth Ave. S.W., Calgary, Alberta T2P 0L7. Telephone: (403) 234-5000. The President is G. G. L. Henderson.

RIGHTS ONG Onshore Licences to Search 80-1 to 80-29 (679 307 ha) through a 'farm-in' with Western Decalta Petroleum (1977) Ltd., and ONG Onshore Licences 83-4 and 83-5 (66 072 ha).

ONG Offshore Licences to Search 74-1 to 74-19 (509 983 ha).

All licences are issued under the Oil and Natural Gas Act, Chapter O-2.1, R.S.N.B. 1976.

LOCATION Licences to Search 80-1 to 80-29 include most of the Moncton and Westmorland subbasins, in addition to the portions of the New Brunswick Platform that border the Moncton Subbasin (Figure 18).

Licences to Search 83-4 and 83-5 are located north of Moncton on the New Brunswick Platform.

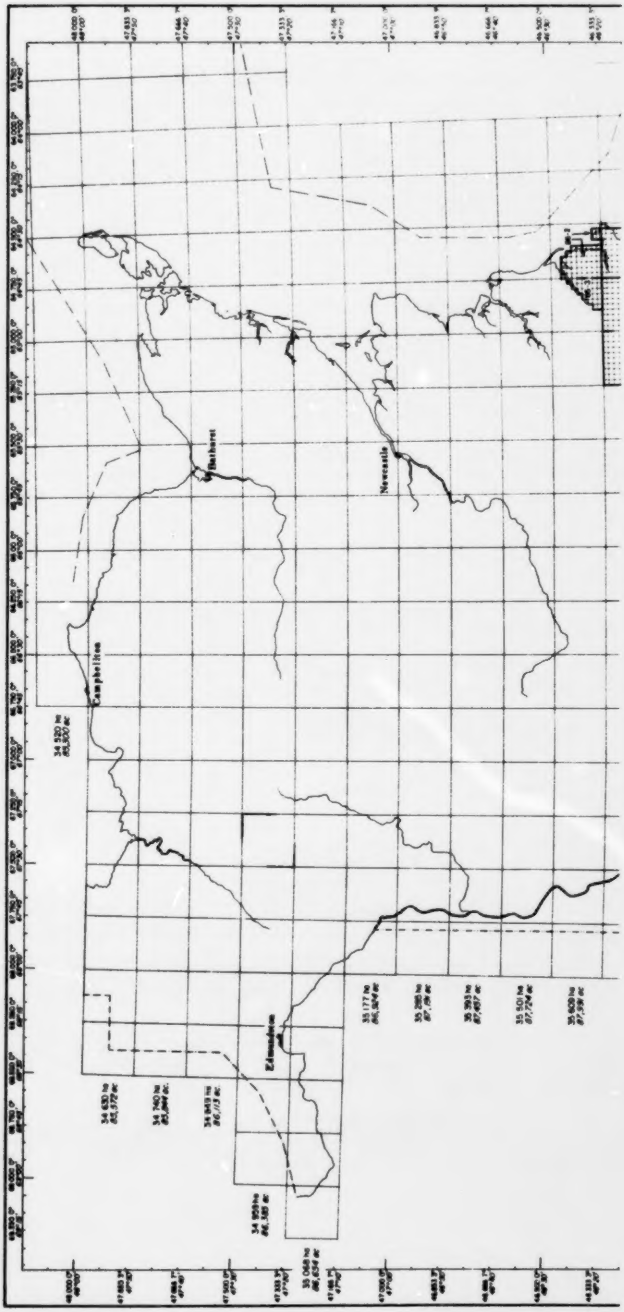
The offshore licences (74-1 to 74-19) cover almost all of the New Brunswick portion of the Bay of Fundy.

HISTORY Chevron Canada Resources and Irving Oil Ltd. formed a partnership and farmed into New Brunswick Oilfields Ltd. ONG Onshore Licences to Search 80-1 to 80-29.

The partnership, in conjunction with New Brunswick Oilfields Limited, acquired ONG Onshore Licences to Search 83-4 to 83-5 in 1983.

In the Bay of Fundy, Chevron Canada Resources and Irving Oil Ltd. farmed into the Mobil-Gulf ONG Offshore Licences to Search 74-1 to 74-19.

EXPLORATION Four holes, totalling 7655 m, were drilled in 1985 (Stoney Creek No. 1, East Stoney Creek No. 1, Hillsborough No. 1, Little River No. 1).


Bathurst
Newcastle
Campbellton
Edmundston
34 520 ha
85,300 ac
34 630 ha
85,572 ac
34 740 ha
85,844 ac
34 849 ha
86,113 ac
34 959 ha
86,385 ac
35 068 ha
86,654 ac
35 177 ha
86,924 ac
35 285 ha
87,191 ac
35 393 ha
87,457 ac
35 501 ha
87,724 ac
35 609 ha
87,991 ac

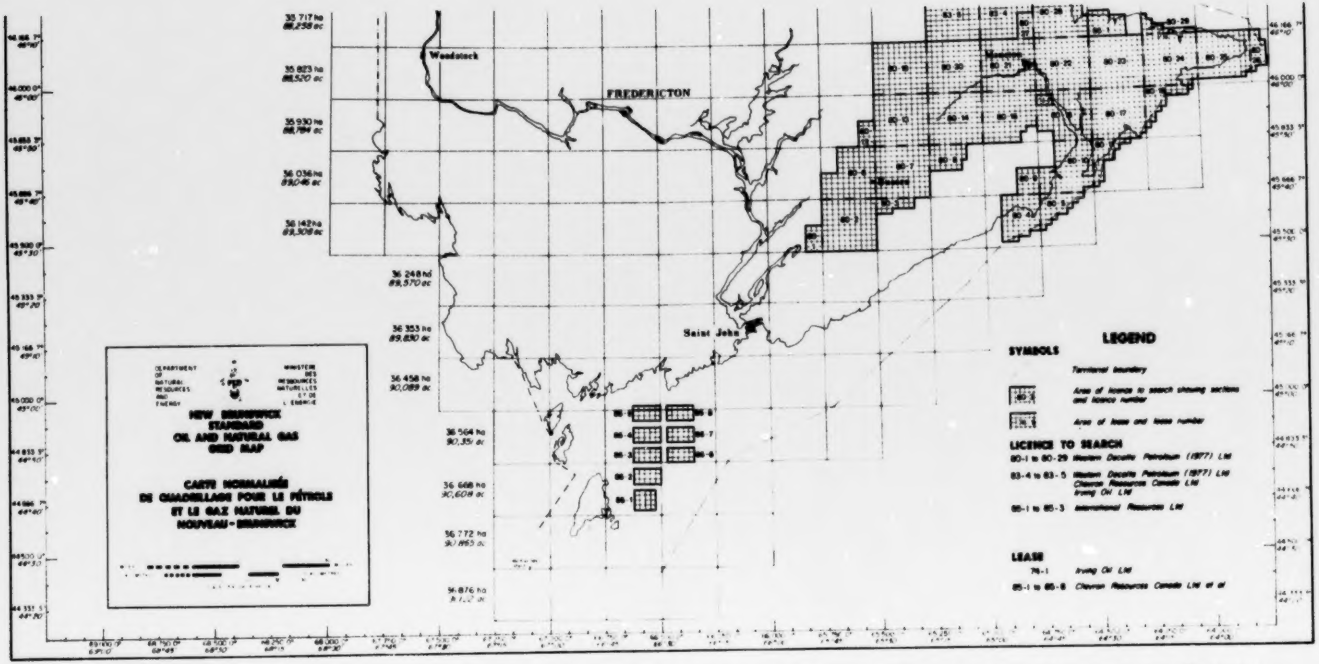

DEPARTMENT OF NATURAL RESOURCES AND ENERGY
MINISTÈRE DES RESSOURCES NATURELLES ET DE L'ÉNERGIE
NEW BRUNSWICK STANDARD OIL AND NATURAL GAS GRID MAP
CARTE NORMALISÉE DE QUADRILLAGE POUR LE PÉTROLE ET LE GAZ NATUREL DU NOUVEAU-BRUNSWICK
Woodstock
FREDERICTON
Moncton
Sussex
Saint John
LEGEND
SYMBOLS
Territorial boundary
Area of licence to search showing sections and licence number
Area of lease and lease number
LICENCE TO SEARCH
80-1 to 80-29 Western Decalta Petroleum (1977) Ltd
83-4 to 83-5 Western Decalta Petroleum (1977) Ltd Chevron Resources Canada Ltd Irving Oil Ltd
85-1 to 85-3 International Resources Ltd
LEASE
76-1 Irving Oil Ltd
85-1 to 85-8 Chevron Resources Canada Ltd et al
35 717 ha 88,258 ac
35 823 ha 88,520 ac
35 930 ha 88,784 ac
36 036 ha 89,046 ac
36 142 ha 89,308 ac
36 248 ha 89,570 ac
36 353 ha 89,830 ac
36 458 ha 90,089 ac
36 564 ha 90,351 ac
36 668 ha 90,608 ac
36 772 ha 90,865 ac
36 876 ha
46°10'
46°00'
45°50'
45°40'
45°30'
45°20'
45°10'
45°00'
44°50'
44°40'
44°30'
44°20'
69°00'
68°45'
68°30'
68°15'
68°00'

Figure 18. Location of Oil Shale Development Permit, and Oil and Natural Gas Licences to Search in New Brunswick.

Ranchman's Resources (1976) Ltd.

COMPANY Ranchman's Resources (1976) Ltd., 550, 500-5th Ave. S.W., Calgary, Alberta T2P 3L5. The President & Chief Executive Officer is N. J. Lashuk.

RIGHTS ONG Onshore Licences to Search 83-1 to 83-3 (64 878.3 ha) under the Oil and Natural Gas Act, Chapter O-2.1, R.S.N.B. 1976.

LOCATION ONG Onshore Licence to Search 83-1 is located approximately 25 km northeast of Moncton, while Licences to Search 83-2 and 83-3 are located approximately 35 km north of Moncton (Figure 18).

HISTORY All three Licences to Search were acquired by Ranchman's Resources (1976) Ltd. in 1983.

EXPLORATION A geological and geophysical compilation of information relating to the Licences to Search has been completed. In addition, 292 gravity stations were read and the results interpreted.

Chapter 3. MINE DEVELOPMENT IN NEW BRUNSWICK

METALLIC MINERALS[17]

Low metal prices have caused mining companies in the province to change the focus of their exploration from base metals to precious and other metals. In addition to the tin and antimony properties that continue in the development stage, Gordex Minerals Ltd. is developing its gold property near Saint John (Figure 19).

Lac Minerals Ltd. (Mount Pleasant) 21 G/7W

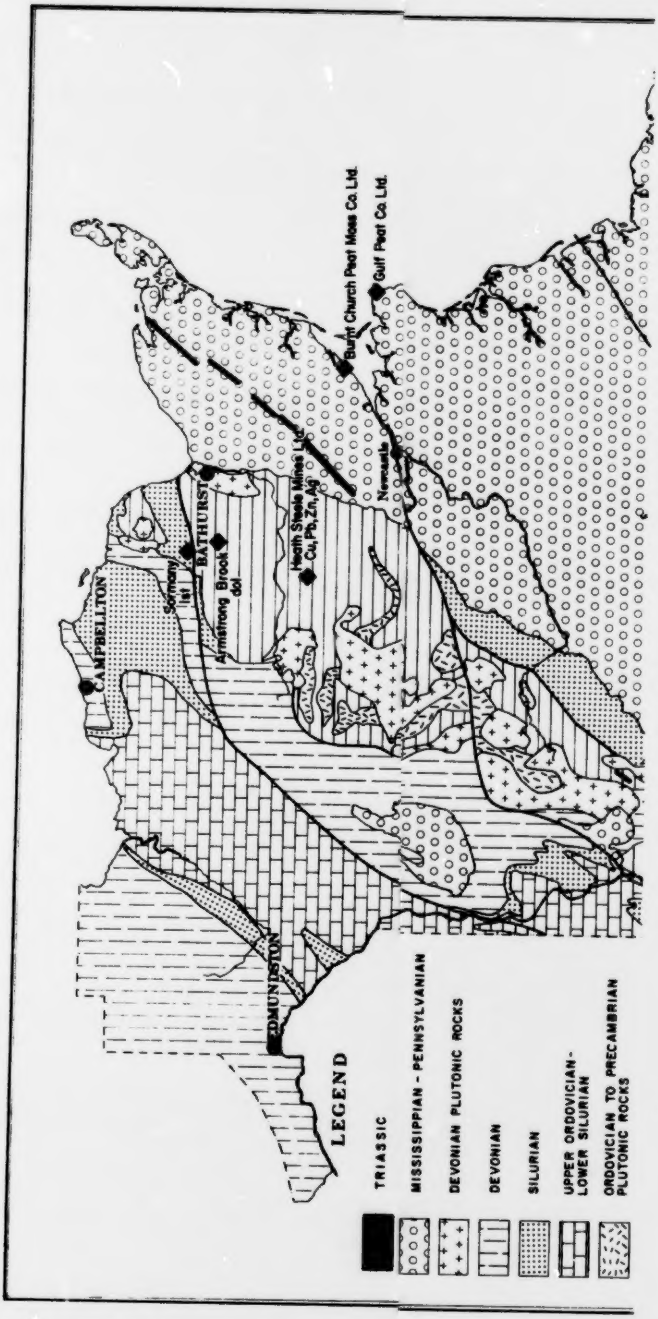
LOCATION The Mount Pleasant property is situated about 50 km northeast of St. Stephen, Charlotte County (Figure 19).

HISTORY A group called Geochemical Associates staked Mount Pleasant in 1954 for Selco Exploration Ltd. Selco drilled four holes in a geochemical anomaly, but no metallic minerals of interest were intersected and the property was returned to Geochemical Associates.

In 1956, Kennco Exploration (Canada) Limited optioned the property and drilled ten holes, but the results were disappointing and Kennco dropped the option. Mount Pleasant Mines Ltd. staked the ground in 1959. Kennco optioned the property again and drilled several holes that intersected tungsten, molybdenum and tin minerals, but the option was dropped again, because the mineralized zone could not be followed.

In 1960, a trenching and diamond drilling programme combined with a detailed geological investigation by the Mount Pleasant Mines geological staff led to the discovery of a tin-base metal ore zone in the northern part of the property. This ore zone is commonly referred to as the North Zone deposit. Deep drill holes also intersected tungsten-molybdenum ores in the northern part of the property (North Zone) and in the Fire Tower Zone (Mount Pleasant), but lack of sufficient funds prevented systematic drilling of these deeper ore zones. The delineation of the complex geology of the property guided subsequent exploration by Sullico Mines Ltd. This company optioned the property in 1967. Drilling by Sullico and later its wholly-owned subsidiary Brunswick Tin Mines Limited led to the delineation of the tungsten-molybdenum ore zones in the Fire Tower Zone and the North Zone.

In 1977, Billiton Canada Limited and Brunswick Tin Mines Limited made a joint venture agreement to bring the Fire Tower Zone's tungsten-molybdenum orebody (Fire Tower Zone West) into production. Mill construction and underground work were completed in 1983 when the first concentrates were produced. Commercial production started in 1984. The mine operated until July 31, 1985 and was forced to close as a result of very poor tungsten and metal prices.


CAMPBELLTON
Sormany lst
BATHURST
Armstrong Brook dol
Heath Steele Mines Ltd. Cu,Pb,Zn,Ag
Burnt Church Peat Moss Co. Ltd.
Gulf Peat Co. Ltd.
Newcastle
EDMUNDSTON
LEGEND
TRIASSIC
MISSISSIPPIAN - PENNSYLVANIAN
DEVONIAN PLUTONIC ROCKS
DEVONIAN
SILURIAN
UPPER ORDOVICIAN-LOWER SILURIAN
ORDOVICIAN TO PRECAMBRIAN PLUTONIC ROCKS

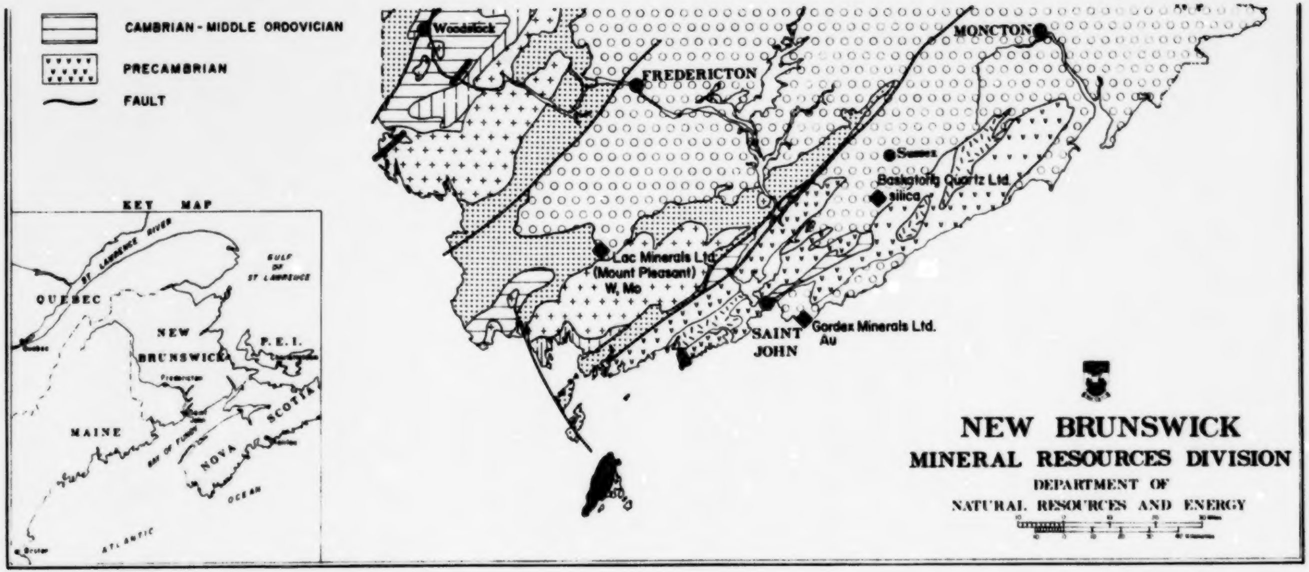

CAMBRIAN - MIDDLE ORDOVICIAN
PRECAMBRIAN
FAULT
KEY MAP
QUEBEC
ST LAWRENCE RIVER
GULF OF ST LAWRENCE
NEW BRUNSWICK
P.E.I.
MAINE
BAY OF FUNDY
NOVA SCOTIA
ATLANTIC
OCEAN
Woodstock
FREDERICTON
MONCTON
Sussex
Baskatong Quartz Ltd.
silica
Lac Minerals Ltd.
(Mount Pleasant)
W, Mo
SAINT JOHN
Gordex Minerals Ltd.
Au
NEW BRUNSWICK
MINERAL RESOURCES DIVISION
DEPARTMENT OF
NATURAL RESOURCES AND ENERGY

Figure 19. Developing mine properties in New Brunswick in 1985.

On October 1, 1985, Lac Minerals entered a 50/50 joint venture agreement with Billiton to explore and possibly develop the North Zone tin deposit, located 1 km north of the present mine site.

COMPANY The Lac/Billiton tin project is operated by Lac Minerals Ltd. with head offices at 2105 N. Tower, P. O. Box 156, Royal Bank Plaza, Toronto, M5J 2J4. Mine Office address is P. O. Box 150, St. George, New Brunswick, E0G 2Y0. The President is P. Allen and Vice-President (Expl.) is D. Sheehan, Mine Manager is B. Bradford.

RESERVES: (Published)

Zone	Reserves(t)	WO_3(%)	MoS_2(%)	Sn(%)
Fire Tower	12 220 000	0.38	0.2	
North	5 900 000			0.79

PRODUCTION There was no production in 1985 and none is planned for 1986.

DEVELOPMENTS Lac Minerals Ltd. optioned the property from Billiton Canada Ltd. for further exploration and development of the North Zone tin prospect.

An underground access ramp (1 km long) was constructed between the present mine site and the North Zone deposit. Exploration drilling from the access ramp into the North Zone deposit is underway.

EMPLOYEES The mine employed an average of 17 persons for 1985.

Heath Steele Mines Limited 21 O/8W

LOCATION The Heath Steele mine is located 51 km northeast of Newcastle in Northumberland County (Figure 19). (Lat. 47°17'N and Long. 66°05'W)

HISTORY The deposit was discovered in 1954 by airborne electromagnetic surveying. Mining began in 1957 but was suspended between 1958 and 1962 because of low metal prices and poor recoveries. The mine reopened in 1962 with a contract to treat the ore from Cominco's Wedge mine. In 1968, the mine began operating under the name Little River Joint Venture, managed and owned 75% by AMAX and 25% by INCO. In 1979, Noranda acquired AMAX's 75% share and ASARCO acquired INCO's 25% share.

On April 29, 1983 sulphide operations ceased due to low metal prices and diminished revenues. The plant was converted to treat gossan ores and recover gold and silver.

This cyanide treatment process started in July 1983. After some start-up problems, the plant operated well, treating a peak of 517 t/d. The gossan operations continued until October 1984.

The mine is now inoperative with a skeletal crew for maintenance pending a decision to reopen. On January 30, 1985 ASARCO decided to write off its 25% share of the Little River Joint Venture.

COMPANY The mine operates under the name Heath Steele Mines Ltd. with head offices at P. O. Box 45, Commerce Court West, Toronto, Ontario M5L 1B6. The mine office address is P. O. Box 4000, Newcastle, New Brunswick E1V 3M5. The President is J. C. White; the Mine Manager is Mr. C. Atkinson.

RESERVES Mineral Inventory (As of December, 1984)

Reserves (t)	Cu (%)	Pb (%)	Zn (%)	Ag (g/t)
16 806 000	1.26	1.62	5.00	66.49

DEVELOPMENTS The company has no immediate plans to flood the mine, and is conducting general maintenance and environmental work in and around the mine.

The Mineral Resources Division is committed to a geological structural study of the Heath Steele deposits under the Federal-Provincial Mineral Development Agreement. This study will be jointly funded for $214 000. Results of this study are expected in the fall of 1986.

EMPLOYEES At the end of 1985, there were 44 employees on site. This number is forecasted to drop to about 20 by the end of 1986.

Gordex Minerals Limited 21 H/4

LOCATION The Gordex Minerals Limited gold property is located at Cape Spencer, 15 km southeast of the City of Saint John, along the Bay of Fundy coast (Figure 19).

HISTORY Minor amounts of gold were found near the lighthouse several years ago. The property was staked in 1979-1980 by Mr. Morton Gordon. An intensive exploration programme conducted during the summer of 1982 led to the delineation of an extensive alteration zone with numerous gold-bearing quartz veins. The company has received permission from the appropriate provincial departments to operate a 30 000 t demonstration plant to leach gold from the ores. A heap-leach process plant, designed by Witteck Development on contract to Gordex, has been constructed on site.

COMPANY The mine is owned by Gordex Minerals Limited with offices at P. O. Box 7071, Station A, Saint John, N.B. E2L 4S5. The President of Gordex Minerals Limited is Mr. Morton Gordon.

EMPLOYEES The operation employs a staff of 10. This figure is expected to reach 35 once the mine has reached design capacity.

RESERVES (Published) 671 328 t of ore, grading 3.3 g/t (0.096 oz./ton) Au, has been outlined on the property to a depth of 152 m. The property has potential reserves of 3 000 000 t.

DEVELOPMENTS Gordex Minerals Ltd. mined 30 000 t of ore from an open pit in its Cape Spencer gold deposit. Testing of Witteck Development Inc.'s heap-leach process was delayed in the winter of 1985 due to extreme cold conditions. The tests will begin in 1986 when temperature conditions are satisfactory.

NONMETALLIC MINERALS[13, 14]

Two companies, Burnt Church Peat Moss Co. Ltd. and Gulf Peat Co. Ltd., were in a development stage in 1985 (Figure 19). Gulf Peat has been experiencing financing difficulties; no definite production date has been given for Burnt Church Peat.

Lockhart Exploration Services Ltd. continued development work on the high-grade silica deposit near Cassidy Lake for Baskatong Quartz Ltd. (Figure 19). Silica was produced for market testing for silicon metal.

Elmtree Resources Ltd. continued development work on the high-grade calcic limestone deposit at Sormany, although plans for quarrying the Armstrong brook dolomite deposit have been delayed (Figure 19).

PEAT[14]

Burnt Church Peat Moss Co. Ltd.

COMPANY Burnt Church Peat Moss Co. Ltd., P. O. Box 78, Shippagan, New Brunswick E0B 2P0. Telephone: (506) 336-2312. The Manager is Julien Mourant.

RIGHTS Peat Moss Lease No. 22 (202 ha) on Bog No. 353, under the Quarriable Substances Act, Chapter Q-1, R.S.N.B. 1968.

LOCATION Bog No. 353 is located 3 km southwest of Burnt Church, Northumberland County (Figure 19).

HISTORY The company acquired a Peat Exploration Licence in 1981 and converted to a Peat Moss Lease in 1983.

RESERVES AND GRADE 9.26 Mm^3 of surficial and 1.06 Mm^3 of humified peat on total bog area as follows:

	Crown (ha)	Freehold (ha)	Total (ha)
Total Bog	90	237	327
>1 m	67	188	255

DEVELOPMENT Nil.

Gulf Peat Co. Ltd.

COMPANY Gulf Peat Co. Ltd., c/o Mr. Robert Richard, R. R. #1, Rogersville, New Brunswick E0A 2T0. The President is Lorraine LaBonté.

RIGHTS Peat Moss Lease No. 21 (734 ha) on Bog No. 338, under the Quarriable Substances Act, Chapter Q-1, R.S.N.B. 1968.

LOCATION Bog No. 338 is located at Point Escuminac, 50 km east of Chatham, Kent County (Figure 19).

HISTORY The company was issued a Peat Exploration Licence (No. P-1-77) on December 1, 1977. It was converted to a Peat Lease (No. 21) on January 1, 1982.

RESERVES AND GRADE 22.80 Mm^3 surficial and 7.09 Mm^3 humified peat on a total bog area as follows:

	Crown (ha)	Freehold (ha)	Total (ha)
Total Bog	559	291	850
>1 m	501	164	665

DEVELOPMENT Attempts were made to sell the company in 1984, but without success. There were no new developments in 1985.

LIMESTONE/DOLOMITE[13]

Sormany Limestone 21 O/9

COMPANY Elmtree Resources Ltd., P. O. Box 665, Bathurst, New Brunswick E2A 3Z6. Telephone: (506) 546-6382. The Executive Officer and President is A. Buzas, and the Manager and Vice-President is G. M. Doucet.

RIGHTS 84.3 ha Quarry Lease No. 27 under the Quarriable Substances Act, Chapter Q-1, R.S.N.B. 1968.

163.5 ha Mining Licence No. 1345 and 16.2 ha Claim Block 993 under the Mining Act, Chapter M-1, R.S.N.B. 1973.

LOCATION The Sormany limestone deposit is located about 30 km west of Bathurst, adjacent to the Millstream River (Figure 19).

HISTORY Although the limestones near Sormany were first mapped by Davies in 1959, it was not until 1982 that Elmtree Resources Ltd. mapped and sampled the deposit in detail.

PRESENT OWNERSHIP Elmtree Resources Ltd.

RESERVES AND GRADES Results indicated an excess of 4 000 000 t of high-grade calcic limestone (53.0% CaO) suitable for quicklime and hydrated lime production.

PRODUCTION Some stone was quarried and hauled to the main crushing facility at Elmtree, where it was marketed as ag lime and smelter flux (see Elmtree Resources Ltd., p. 141).

DEVELOPMENT Two holes were drilled to further test the extent and grade continuity of the limestone at depth. Results were encouraging enough to proceed with site preparation for quarry development. Some stone was hauled to the crushing facility at Elmtree where it was marketed as ag lime. A decision to construct a lime-burning kiln has been delayed.

EMPLOYEES Manpower was provided by staff of Elmtree Resources Ltd.

Armstrong Brook Dolomite 21 P/12W

COMPANY Elmtree Resources Ltd., P. O. Box 665, Bathurst, New Brunswick E2A 3Z6. Telephone: (506) 546-6382. The Executive Officer and President is A. Buzas, and the Manager and Vice-President is G. M. Doucet.

RIGHTS 59.10 ha Quarry Lease No. 26 under the Quarriable Substances Act, Chapter Q-1, R.S.N.B. 1968.

161.1 ha Mining Licence No. 1344, under the Mining Act, Chapter M-1, R.S.N.B. 1973.

LOCATION The Armstrong Brook dolomite deposit is located about 22 km west of Bathurst, Gloucester County (Figure 19).

HISTORY The deposit was probably found several years, perhaps decades ago. It appears to have been used by local farmers, since the ruins of old kilns are present in the area. The deposit was apparently rediscovered by Anaconda geologists in the fifties while exploring for sulphide deposits. It was briefly investigated by J. W. McCarthy in the early seventies and later staked by Elmtree Resources Ltd. in 1982. An access road was constructed in 1983 and limited production for testing purposes was undertaken.

PRESENT OWNERSHIP Elmtree Resources Ltd.

RESERVES AND GRADES Exploration and development work, carried out by Elmtree Resources Ltd., has resulted in the delineation of an excess of 2 000 000 t of dolomite grading up to 37% $MgCO_3$.

PRODUCTION None.

DEVELOPMENT Plans for the installation of additional crushing equipment to handle production of dolomitic ag lime and construction stone have been delayed.

EMPLOYEES Manpower was provided by the staff of Elmtree Resources Ltd.

SILICA[13]

Baskatong Quartz Ltd. 21 H/12

COMPANY The Sussex silica deposit is owned by Baskatong Quartz Ltd., P. O. Box 337, N.D.G., Montreal, Quebec, H4A 3P6. Telephone: 514-482-6357.

RIGHTS Mining Lease 241 (599 ha) and 24 claims (387 ha) under the Mining Act, Chapter M-14, R.S.N.B. 1973.

LOCATION This deposit of unconsolidated silica sand is about 16 km southwest of Sussex, immediately northeast of Cassidy Lake (Figure 19).

HISTORY The deposit was discovered in 1982. After identifying sufficient reserves of high-quality material, a pilot plant was set up in 1983 for product testing and marketing.

PRESENT OWNERSHIP Baskatong Quartz Ltd. of Quebec and Lockhart Exploration Services Ltd. have interests in the property.

RESERVES AND GRADES Approximately 9 000 000 t proven reserves and over 22 000 000 t possible reserves of silica sand containing greater than 98% SiO_2 are indicated.

PRODUCTION Production to date has been restricted to bulk samples sent for pilot testing. Production in 1985 was about 2 000 t.

DEVELOPMENT Pilot testing indicates that the silica can be utilized in the manufacture of silicon carbide, ferrosilicon (silicon metal), glass sand, and sand blast sand.

EMPLOYEES None.

ENERGY RESOURCES

OIL SHALE[9]

Canadian Occidental Petroleum Limited 21 H/15E

COMPANY: Canadian Occidental Petroleum Limited, 1500, 635-8th Avenue S.W., Calgary, Alberta T2P 3Z1. Telephone: (403) 234-6700. The President is J. Angus McKee and the General Manager (oil shales) is E. Yildirim.

RIGHTS: The company retains a 1439 ha Bituminous Shale Development Permit L7401 under the Bituminous Shale Act, Chapter B-4.1, R.S.N.B. 1976 (Figure 18).

LOCATION: The permit tract lies in the Albert Mines area about 25 km south-southeast of Moncton in Albert County.

HISTORY: Bituminous shale was first reported at Albert Mines by Dr. Abraham Gesner in 1841. The area is best known for the solid hydrocarbon (albertite) vein that was discovered there by John Duffy in 1851. The vein was mined out between 1852 and 1880.

The importance of the oil shales first gained attention between 1854 and 1856 when Dr. Gesner retorted a burning oil from them. Following the closure of the albertite mine in 1880, the area attracted little interest until 1902 when R. W. Ells of the Canada Department of Mines began to study the oil shales. In 1942, the Canada Department of Mines drilled 36 shallow core holes near the old mine. In 1968, the Atlantic Richfield Company Limited drilled two holes at Albert Mines. One of these holes assayed 63 L/t shale oil over 130 m.

PRESENT OWNERSHIP: Canadian Occidental Petroleum Limited is a public company, with 48% ownership by Occidental Petroleum Limited and 52% by shareholers.

RESERVES AND GRADES: In 1942, the Canada Department of Mines estimated that there were 90 900 000 t of oil shale averaging 44 L/t, yielding about 47 700 m^3 (300 000 barrels) of shale oil to a depth of 120 m. In 1982, the Geological Survey of Canada and the New Brunswick Department of Natural Resources estimated that there were about 42 925 000 m^3 (270,000,000 barrels) of oil in situ to a depth of 600 m.

PRODUCTION: In 1974, Canadian Occidental Petroleum Limited acquired the rights to the Albert Mines area by means of a Bituminous Shale Licence to Search covering 404 700 ha in southeastern New Brunswick. They converted this licence in 1981 to a lease of about 29 138 ha. Between 1974 and 1981 nine core holes were drilled and a high-grade oil shale zone was partially delineated. In 1983, the lease area was reduced to 1439 ha.

In 1985, Canadian Occidental completed a resource evaluation study which began in 1984. The resource evaluation provided the basis for a mine evaluation plan for the Albert Mines site. A general plan for large-scale mining and a plan for excavating 40 000 to 50 000 t of shale from a small test pit have been submitted. The test pit sample will be provided to the New Brunswick Eletric Power Commission to run in their Chatham circulating fluidized bed cocombustion demonstration plant in 1986.

In the past, Canadian Occidental has provided several tonnes of oil shale to Umatac Industrial Processes of Alberta, Lurgi GmbH of Germany, and the New Brunswick Electric Power Commission. The samples will provide additional data on retorting and fluidized bed combustion characteristics of Albert Mines oil shale.

CHAPTER 4. PRODUCING MINES, QUARRIES, OIL & NATURAL GAS WELLS IN NEW BRUNSWICK

VALUE OF PRODUCTION[20]

The total value of minerals produced in New Brunswick during 1985 declined 10.7% from the record high of $617 969 438 for 1984. The value for 1985, as shown by the preliminary figures, is $552 132 000 (Table 5). The decline is due mainly to the low prices for lead and zinc. The reduction in value is accounted for in the metals while the other three groups, nonmetallic minerals, fuels and structural materials, show a small increase (Table 6). The increase in nonmetallic minerals is due to the second potash producer coming on stream.

On a province-by-province basis in 1985, New Brunswick ranked first in bismuth; second in potash, peat, tungsten and antimony; third in zinc, silver and lead; and fifth in coal, copper, stone and clay products. (Table 7).

The 1985 preliminary statistics for value of metals produced (which includes antimony, bismuth, copper, gold, lead, silver, and zinc) totalled $415 564 000, down from the 1984 final figure of $497 981 000.

The 1985 value for nonmetallic or industrial minerals totalled $60 934 000, up from the 1984 final figure of $47 973 438. These commodities include peat, potash, silica, salt, and sulphur in smelter gas.

The preliminary 1985 value of fuels produced (which includes coal, natural gas and petroleum crude) has increased slightly from $29 837 000 to $30 015 000.

The value of structural materials for 1985 (which includes clay products, cement, lime, stone, and sand and gravel) totalled $45 619 000, up from $42 178 000 for the previous year (Figure 20).

The mineral industry is considered a major contributor to New Brunswick's economy, as evidenced by the forecasted capital expenditures of the companies involved. It is estimated that the value of production should increase greatly over the next few years as more properties come into production. Figure 21 shows the locations of the nonrenewable resource producers in the Province.

EMPLOYMENT[20]

In 1985, there were 4374 people directly employed at producing mines and quarries, which is an increase of 98 from 1984. The employment figure shows an increase even with the closure of the Mount Pleasant tungsten mine.

Table 5.
Mineral Production
New Brunswick
1985

Preliminary Estimate

METALS	Units	Quantity	Value ($)
Antimony	kg	---	2 344 000
Bismuth	kg	186 000	3 641 000
Cadmium	kg	73 000	266 000
Copper	kg	6 585 000	13 031 000
Gold	g	252 000	3 506 000
Lead	kg	73 398 000	42 362 000
Silver	kg	187 000	52 215 000
Tungsten	kg	---	5 324 000
Zinc	kg	230 974 000	292 875 000
TOTAL			415 564 000
NONMETALLICS			
Peat	t	201 000	13 154 000
Potash	t	---	31 744 000
*Silica	t	---	1 200 000
Salt	t	---	3 206 000
Sulphur, in smelter gas	t	95 000	11 630 000
TOTAL			60 934 000
FUELS			
Coal	t	555 000	29 800 000
Natural Gas	m^3	4 000	200 000
Petroleum Crude	m^3	---	15 000
TOTAL			30 015 000
STRUCTURAL MATERIALS			
Clay products		---	4 325 000
Cement		---	15 134 000
Lime		---	5 340 000
Sand and Gravel	t	7 600 000	9 700 000
Stone	t	2 060 000	11 120 000
TOTAL			45 619 000
GRAND TOTAL 1985 (Preliminary)			$552 132 000

*Formerly reported as "Quartz"

Table 6.
Mineral Production in New Brunswick
1956 to 1985

Calendar Year	Metals ($)	Nonmetals ($)	Fuels ($)	Structural Materials ($)	Total ($)
1956	337 234	744 262	8 155 040	9 021 766	18 258 302
1957	4 789 658	951 178	8 424 346	9 056 683	23 221 865
1958	1 114 700	944 321	6 964 888	8 576 845	17 600 754
1959	---	941 330	8 533 822	8 636 080	18 111 232
1960	---	1 101 722	8 834 749	7 136 268	17 072 739
1961	---	1 379 335	7 686 695	9 738 355	18 804 385
1962	3 483 969	1 571 082	6 900 984	9 855 540	21 811 575
1963	9 255 246	1 224 450	7 352 023	10 511 700	28 343 419
1964	29 648 079	1 099 685	8 573 688	9 355 260	48 676 712
1965	62 461 357	1 742 662	8 742 980	9 210 353	82 158 352
1966	69 386 294	1 894 992	8 005 535	10 934 416	90 221 237
1967	67 957 099	2 427 150	7 568 509	12 465 932	90 418 690
1968	69 622 942	2 915 246	7 436 931	8 476 317	88 451 436
1969	77 562 887	3 603 831	5 757 473	7 668 374	94 592 565
1970	89 939 781	2 785 381	3 086 033	8 979 360	104 790 555
1971	91 049 256	2 902 648	4 038 971	9 242 071	107 232 946
1972	98 772 724	3 820 526	3 552 863	14 024 867	120 170 980
1973	132 797 907	4 243 694	3 434 416	23 701 754	164 177 771
1974	184 142 991	5 742 863	5 441 537	21 255 701	216 583 092
1975	197 230 888	6 252 923	7 473 197	20 965 912	231 922 920
1976	195 340 976	7 163 466	5 988 243	30 090 493	238 583 178
1977	238 583 350	10 037 550	6 333 791	34 439 352	289 394 043
1978	281 770 379	11 467 716	8 811 135	37 670 743	339 719 973
1979	419 123 591	11 658 369	10 394 844	38 510 412	479 687 216
1980	302 674 000	13 192 293	17 282 186	40 981 000	374 129 479
1981	452 580 000	16 666 976	23 325 535	39 769 000	532 341 511
1982	409 832 000	20 587 126	24 630 614	43 241 000	498 290 740
1983	421 281 000	19 220 800	29 707 000	38 385 000	508 593 800
1984	497 981 000	47 973 438	29 837 000	42 178 000	617 969 438
1985(P)	415 564 000	60 934 000	30 015 000	45 619 000	552 132 000

Table 7.

Rank of Provinces and Territories, in value of production
for leading minerals in Canada, 1985 (p)

Mineral	Nfld.	P.E.I.	N.S.	N.B.	Que.	Ont.	Man.	Sask.	Alta.	B.C.	Y.T.	N.W.T.	Total Value Canada ($ millions)
Petroleum, Crude				7		6	4	2	1	3		5	18 938
Natural Gas				6		4		3	1	2		5	7 906
Coal			3	5				4	2	1			1 884
Copper				5	3	2	4	6		1			1 445
Zinc	7			3	5	2	6	8		4	9	1	1 317
Gold				7	2	1	6	8	9	4	5	3	1 197
Cement	9		6	8	2	1	5	7	3	4			780
Potash				2				1					642
Sand & Gravel	9	11	8	10	4	1	6	7	2	3	12	5	551
Stone	7		4	5	2	1	6		8	3		9	378
Silver				3	4	1	6	8		2	5	7	337
Salt			5	6	4	1		2	3				226
Lead				3		4	6			1	5	2	152
Clay Products	9		3	5	2	1	8	6	4	7			144
Lime				6	2	1	5		3	4			137
Gypsum	3		1			2	5			4			80
Molybdenum					2					1			75
Sulphur, in Smelter Gas				3	2	1	7			5	6	4	66
Peat	10	7	6	2	1	8	3	5	4	9			58
Tungsten				2								1	45
Quartz	5		8	6	7	1	3	8	2	4			44
Cadmium				6	5	1	4	7		2	8	3	6
Antimony				2						1			6
Bismuth				1		4	6			2	5	3	4

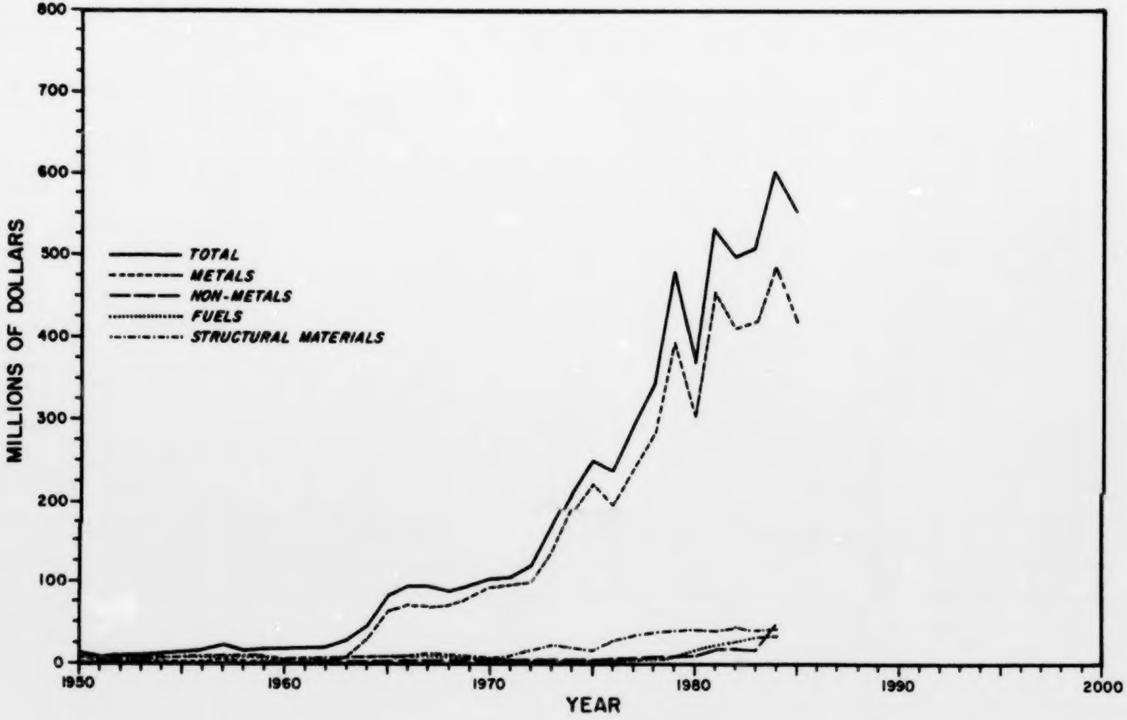


Figure 20. Value of mineral production in New Brunswick, 1950-1985.

The various sectors show the following employment figures for 1985: metals - 2457; potash - 959; coal - 260; peat - 466; and structural materials - 232.

Scientific, technical, administrative and casual staff employed by the Province in support of mineral resource development totalled 50 during 1985.

METALLIC MINERALS[17]

Brunswick Mining and Smelting Corporation Limited 21 P/12

Brunswick operates one mine (No. 12), a concentrator, a lead smelter and a fertilizer plant.

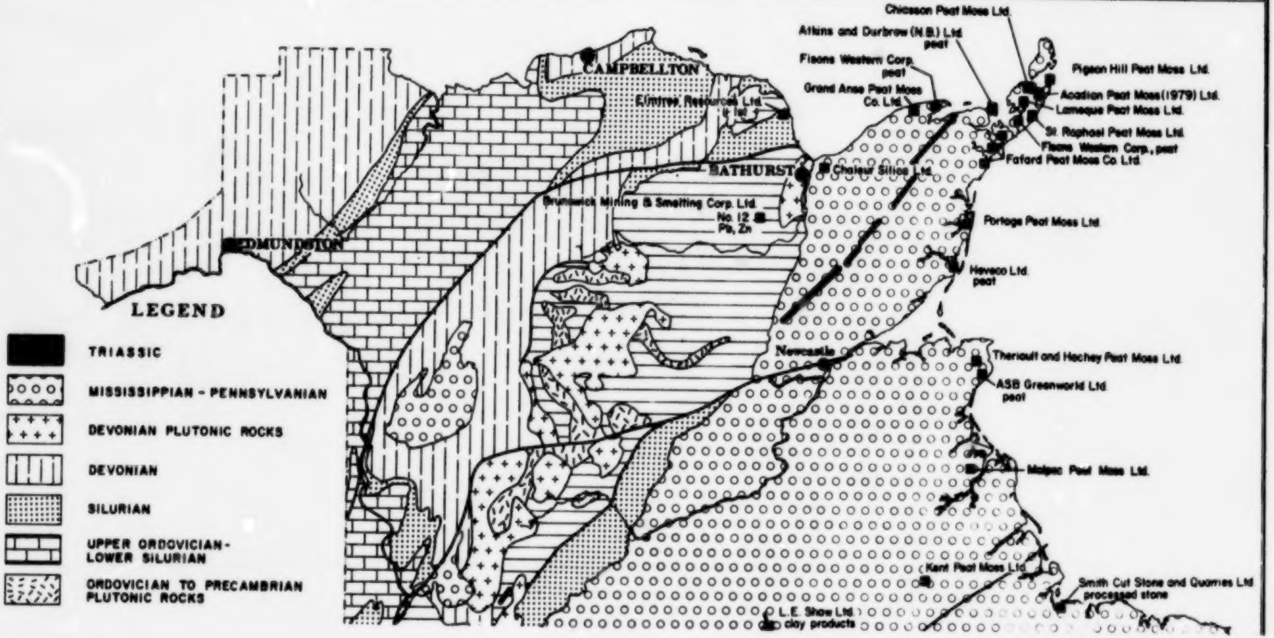
LOCATION: The Brunswick No. 12 mine is located about 15 miles west of Bathurst in Gloucester County (Lat. 47°28.5'N and Long. 65°53.5'W). The concentrator is adjacent to No. 12 mine (Figure 21). The lead smelter is located at Belledune Point, about 45 km from the No. 12 mine.

HISTORY: The presence of sulphides was noted in 1907; however, drilling of ground electromagnetic targets in 1952 located the No. 6 mine. Investigation of another electromagnetic anomaly on strike pinpointed the site of No. 12 mine in 1953. The property was granted to Brunswick Mining and Smelting Corporation Limited, which was controlled at that time by St. Joseph's Lead Company. During the period 1953-57, an open pit and pilot mill were constructed at the No. 6 location. In 1961, interest transferred to M. J. Boylen, K. C. Irving, and Patino Corporation. Development commenced at No. 12 in 1962 and mine production began in 1964. Production began at the No. 6 mine in 1966. In 1967, Noranda invested $50 000 000 and gained control of Brunswick Mining and Smelting Corporation Limited. Noranda proposed a $50 000 000 expansion, which was started in 1974 and completed in 1981. A total capital expenditure of $69 000 000 was made at the mine and smelter between 1979 and 1981.

COMPANY Head Office - P. O. Box 45, Commerce Court W., Toronto; Mine Office - P. O. Box 3000, Bathurst; Smelter Officer - P. O. Box 2000, Belledune. The President is J. A. Hall; Operations Senior Vice-President is J. C. White; Vice-President - Mining is J. W. Moerman; Vice-President - Smelting & Fertilizer Division is A. Young.

EMPLOYEES (December, 1985) There were 1660 persons employed at the mine and 634 persons at the smelter.

RESERVES (December, 1985) 104 750 000 t grading 0.32% Cu, 3.69% Pb, 9.04% Zn and 98.4 g/t Ag.


LEGEND
▇ TRIASSIC
MISSISSIPPIAN - PENNSYLVANIAN
DEVONIAN PLUTONIC ROCKS
DEVONIAN
SILURIAN
UPPER ORDOVICIAN-LOWER SILURIAN
ORDOVICIAN TO PRECAMBRIAN PLUTONIC ROCKS
EDMUNDSTON
CAMPBELLTON
BATHURST
Newcastle
Elmtree Resources Ltd.
Brunswick Mining & Smelting Corp. Ltd.
No. 12
Pb, Zn
Chaleur Silica Ltd.
Grand Anse Peat Moss Co. Ltd.
Fisons Western Corp. peat
Atkins and Durbrow (N.B.) Ltd. peat
Chicsson Peat Moss Ltd.
Pigeon Hill Peat Moss Ltd.
Acadian Peat Moss (1979) Ltd.
Lameque Peat Moss Ltd.
St. Raphael Peat Moss Ltd.
Fisons Western Corp., peat
Fafard Peat Moss Co. Ltd.
Portage Peat Moss Ltd.
Haveco Ltd. peat
Theriault and Hachey Peat Moss Ltd.
ASB Greenworld Ltd. peat
Malpec Peat Moss Ltd.
Kent Peat Moss Ltd.
Smith Cut Stone and Quarries Ltd processed stone
L.E. Shaw Ltd. clay products

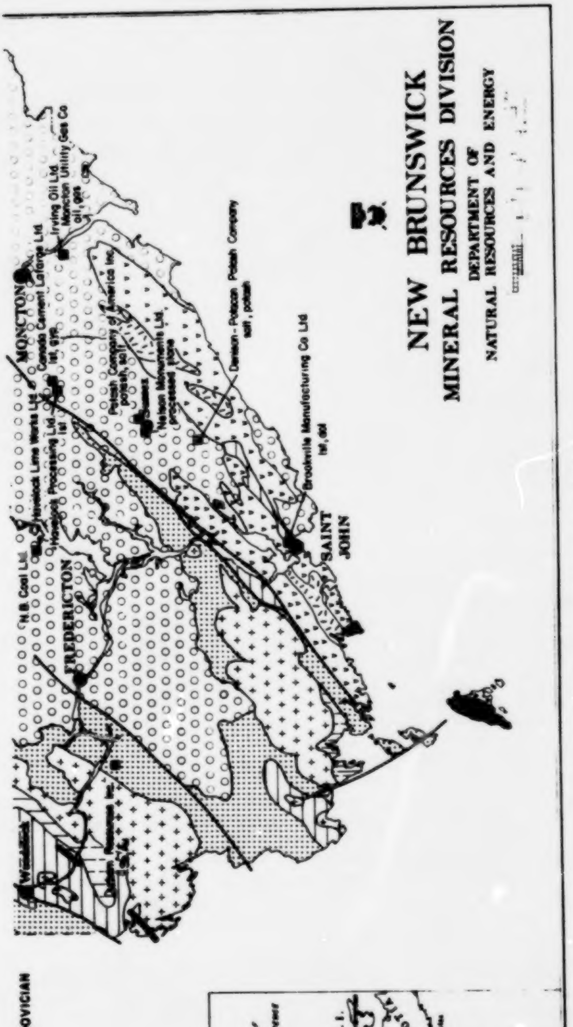

NEW BRUNSWICK
MINERAL RESOURCES DIVISION
DEPARTMENT OF
NATURAL RESOURCES AND ENERGY
MONCTON
FREDERICTON
SAINT JOHN
N.B. Coal Ltd.
New Brunswick Lime Works Ltd.
Havelock Processing Ltd.
Canada Cement Lafarge Ltd.
Irving Oil Ltd.
Moncton Utility Gas Co
oil, gas
Potash Company of America Inc.
potash, salt
Nelson Monuments Ltd.
processed stone
Denison-Potacan Potash Company
salt, potash
Brookville Manufacturing Co Ltd
CAMBRIAN - MIDDLE ORDOVICIAN
PRECAMBRIAN
FAULT
KEY MAP
QUEBEC
NEW BRUNSWICK
MAINE
P.E.I.
NOVA SCOTIA
GULF OF ST LAWRENCE
ATLANTIC OCEAN

Figure 21. Nonrenewable resource producers in New Brunswick in 1985.

PRODUCTION

	Production (t)	Cu (%)	Pb (%)	Zn (%)	Ag (g/t)
ORE (No. 12 mine)					
Concentrate	3 311 608	0.32	3.52	8.77	101
Copper	26 325	20.94	7.45	3.49	2 940
Lead	187 949	0.43	33.56	5.03	477
Zinc	421 217	0.31	2.15	50.99	98
Bulk	71 197	0.61	18.98	31.82	350
Pyrite	687	2.50	3.52	14.48	466
Tailings	2 604 233	0.10	1.11	1.63	38
SMELTER (metal)					
Lead	53 080				
Silver (kg)	82 680				
Sulphuric acid	154 000				
Copper matte	3 100				
Antimony slag	5 000				
Lead-bismuth alloy	2 000				

DEVELOPMENTS Brunswick Mining and Smelting Corporation Limited lost $5 600 000 in 1985 as a result of very poor base metal prices. In a cost cutting move spurred by depressed prices, Brunswick announced plans to cut 370 jobs over the next three years. This will be done by offering early retirement and by attrition.

Durham Resources Inc. 21 G/14

LOCATION The Lake George antimony mine is situated about 15 km north of Harvey Station, York County (Figure 21).

HISTORY Antimony sulphide was first discovered on the property in 1863. There was minor production between 1880 and 1884. The first major development that led to production occurred in 1969-1971. The mine produced until 1981 when it ran out of known reserves.

COMPANY The mine is owned by Oakwood Petroleum and operates under the name of Durham Resources Inc. with head offices at 111 Richmond Street West, Suite 916, Toronto, Ontario M5H 2G4. Chairman and President of Durham Resources Inc. is R. Granger. The executive Vice-President and Chief Operating Officer is H. Harbinson; the Mine Manager is B. Bourgoin.

EMPLOYEES There are 36 employees on the site. This number is expected to gradually increase to 100 persons at full production.

RESERVES (December, 1984) Indicated 850 000 t 4.15% Sb.

PRODUCTION Production in 1985 was 47 000 t of ore yielding 1378.5 t of antimony concentrate.

DEVELOPENTS: Shaft development was completed in June 1985. Recent work involved drifting on the 244 m, 305 m, 300 m and 350 m levels. Westerly extension of drifts at the 305 m and 350 m levels along the Hibbard vein structure was continued. The drifts were designed to intersect a mineralized zone that was found by surface diamond drilling. Four stopes have been developed and milling proceeded at 363 t/d.

The price of antimony concentrate has declined in recent years, while the price of antimony metal has shown some improvement. Since the mine presently produces only concentrates, some losses were evident. As a result, Durham Resources Inc. is considering the building of facilities to further process their concentrates into a trioxide or metal product. This will give Durham Resources Inc. the option of selling either the concentrate or the metal.

NONMETALLIC MINERALS

PEAT[14]

Fifteen companies were engaged in the production of peat moss in 1985, including the first year of production for Malpec Peat Moss Ltd. from their bog 3 km west of Rexton in Kent County (Figure 21). Canadian Supreme Products Ltd. engaged in an option agreement to purchase Portage Peat Moss Ltd. Peat moss production started in late April, an exceptionally early start-up date, but was plagued by adverse weather conditions during the summer months. Excellent weather conditions in September and October contributed to record shipment levels.

Peat Shipments

Year	Bale Equivalents*
1981	2 973 000
1982	3 035 000
1983	3 900 000
1984	4 062 000
1985	4 086 000

Acadian Peat Moss (1979) Ltd.

COMPANY Acadian Peat Moss (1979) Ltd., P. O. Box 240, Lamèque, New Brunswick E0B 1V0. Telephone: (506) 344-2426. The President is Elphege Chiasson; the Manager is Jean-Marc Savoie.

RIGHTS Peat Moss Lease No. 13 (232 ha) on Bog No. 568 under the Quarriable Substances Act, Chapter Q-1, R.S.N.B. 1968.

LOCATION Bog No. 568 is adjacent to the Couteau Road on Lamèque Island, Gloucester County (Figure 21).

HISTORY Established in 1965, the company originally produced block-cut peat, but now also produces milled peat. Following a disastrous fire in 1981 the company assumed full production in 1982.

PRESENT OWNERSHIP Acadian Peat Moss (1979) Ltd.

RESERVES AND GRADE 7.33 Mm^3 surficial and 3.41 Mm^3 humified peat on a total bog area as follows:

	Crown (ha)	Freehold (ha)	Total (ha)
Total Bog	206	134	340
$>$1 m			
In Production	128	16	144

PRODUCTION The company has an annual production capacity of 320 000 bale equivalents.

EMPLOYEES 1985 - 6 to 54 persons.

DEVELOPMENT Continued expansion of existing lease. Production from Bog No. 567, held under lease by La Tourbiere Chiasson, is usually included in production figures since the only bagging facilities are located at Bog No. 568.

ASB Greenworld Ltd.

COMPANY ASB Greenworld Ltd., Pointe Sapin, Kent County, New Brunswick E0A 2A0. Telephone: (506) 876-3937. The Manager is Guenter Worfel.

RIGHTS Peat Moss Lease No. 19 (627 ha) on Bog No. 324E, under the Quarriable Substances Act, Chapter Q-1, R.S.N.B. 1968.

LOCATION Bog No. 324E is located 1 km northwest of Pointe Sapin in Kent County (Figure 21).

HISTORY The company commenced site preparation in 1978 prior to acquiring a lease in 1982.

PRESENT OWNERSHIP ASB Greenworld Ltd.

RESERVES AND GRADE 57.29 Mm^3 surficial and 12.26 Mm^3 humified peat on a total bog area as follows:

	Crown (ha)	Freehold (ha)	Total (ha)
Total Bog	1591	386	1977
>1 m	1360	183	1543
In Production	130	32	162

PRODUCTION The company produces baled peat and peat-soil mixes, and has an annual production capacity of 360 000 bale equivalents.

DEVELOPMENT The company continued to work toward increasing the ratio of soil mixes to baled peat.

EMPLOYEES 1985 - 8 to 45 persons.

Atkins and Durbrow (N.B.) Ltd.

COMPANY Atkins and Durbrow (N.B.) Ltd., P. O. Box 88, Bas Caraquet, Gloucester County, New Brunswick E0B 1E0. Telephone: (506) 727-3385. The Manager is Eino Kivipato.

RIGHTS Peat Moss Lease No. 7 (202 ha) on Bog No. 600, under the Quarriable Substances Act, Chapter Q-1, R.S.N.B. 1968.

LOCATION Bog No. 600 is located on Pokesudie Island (Figure 21).

HISTORY The company has been producing peat since 1886, but first commenced production in New Brunswick in 1965. Following a disastrous fire in 1978, the operation was rebuilt and production was resumed in late 1980.

PRESENT OWNERSHIP Atkins and Durbrow (N.B.) Ltd.

RESERVES AND GRADE 2.2 Mm^3 surficial and 1.38 Mm^3 humified peat on a total bog area as follows:

	Crown (ha)	Freehold (ha)	Total (ha)
Total Bog	179	215	394
>1 m	128	22	150
In Production	113	1	114

PRODUCTION The company produces baled peat and has an annual capacity of 110 000 bale equivalents.

DEVELOPMENT Continued peat production.

EMPLOYEES 1985 - 1 to 26 persons

Chiasson Peat Moss Ltd.

COMPANY Chiasson Peat Moss Ltd., P. O. Box 112, Lamèque, New Brunswick E0B 1V0. Telephone: (506) 344-2426. The President is Elphege Chiasson; the Manager is Gilles Haché.

RIGHTS Peat Moss Lease No. 23 (76 ha) on Bog No. 567 under the Quarriable Substances Act, Chapter Q-1, R.S.N.B. 1968.

LOCATION Bog No. 567 is located 3 km southeast of Little Shippagan (Figure 21).

HISTORY The company acquired an Exploration Licence in 1982 and converted to a lease in the same year.

PRESENT OWNERSHIP La Tourbe Chiasson Ltée.

RESERVES AND GRADE 2.21 Mm^3 surficial and 1.06 Mm^3 humified peat on a total bog area as follows:

	Crown (ha)	Freehold (ha)	Total (ha)
Total Bog	65	38	103
>1 m	53	21	74
In Production	50	20	70

PRODUCTION The company produces baled peat and has an annual production capacity directly related to that of Acadian Peat Moss (1979) Ltd. The product is presently baled at the Acadian Peat Moss (1979) Ltd. facility owned by the same principals.

DEVELOPMENT Continued baled peat production.

Fafard Peat Moss Co. Ltd.

COMPANY Fafard Peat Moss Co. Ltd., P. O. Box 70, Shippagan, Gloucester County, New Brunswick. Telephone: (506) 366-2325. The Manager is René Martin.

RIGHTS Peat Moss Lease Nos. 4 (364 ha), 5 (506 ha) and 6 (607 ha) under the Quarriable Substances Act, Chapter Q-1, R.S.N.B. 1968.

LOCATION All bogs are in Gloucester County (Figure 21).

Lease	Bog No.	Size (ha)	Location
4	530	364	Pokemouche Bog, off Route 113 at Inkerman
5	532	506	Six Road Bog, 15 km south of Shippagan
6	529	607	Inkerman Ferry Bog, 8 km southwest of Shippagan

HISTORY The company commenced production at Bog 530 in 1941 producing block-cut, hand-cut peat. Similarly, block-cut peat was produced from Bog No. 532 until the company began producing milled peat in 1966. The company commenced mechanized block-cut peat production in 1971, but then ceased all block-cut operations in 1977. Presently, only milled peat is produced from three bogs.

PRESENT OWNERSHIP Fafard Peat Moss Co. Ltd.

RESERVES AND GRADE

Bog No.	Surficial (Mm^3)	Humified (Mm^3)
529	7.80	14.59
530	8.15	3.22
532	11.49	6.77

Bog areas include the following:

	Crown (ha)	Freehold (ha)	Total (ha)
Bog 529			
Total Bog	663	311	974
>1 m	468	140	608
In Production	113	3	116
Bog 530			
Total Bog	416	67	483
>1 m	387	41	428
In Production	120	12	132

	Crown (ha)	Freehold (ha)	Total (ha)
Bog 532			
Total Bog	370	206	576
>1 m	360	134	494
In Production	274	50	324

PRODUCTION The company produces baled peat and peat mixes and has an annual capacity of 1 250 000 bale equivalents.

DEVELOPMENT Continued to develop the remaining potential on Bog Nos. 529 and 532. Sections of Bog No. 530 that were originally hand cut have been abandoned.

EMPLOYEES 1985 - 6 to 74 persons.

Fisons Western Corp.

COMPANY Fisons Western Corp., Maisonnette, New Brunswick E0B 1X0. Telephone: (506) 727-3428. The Manager is Edward Puhacz.

RIGHTS Peat Moss Lease No. 10 (1724 ha) and No. 12 (396 ha) under the Quarriable Substances Act, Chapter Q-1, R.S.N.B. 1968.

LOCATION (Figure 21)

Lease	Bog No.	Size (ha)	Location
10	527		1 km south of centre of Shippagan
	591	1724	2 km south of Lamèque
	592		4 km southeast of Lamèque
12	562		6 km west of Lamèque at Maisonnette

HISTORY Western Peat Moss Co. Ltd. started production in British Columbia in 1938-39. Commercial production in New Brunswick commenced in 1964 on Bog 562. Western produced on Bog 527 from 1942-48 and commenced production from Bog 562 in 1963. Atlantic produced from Bog 527 between 1953 and 1970-71. They also produced from Bog 591 commencing in 1952. Western acquired Atlantic in 1970 and continued production from Bogs 562 and 591. Fisons acquired Western Atlantic in 1980 and incorporated under the name of Fisons Western Inc. in 1981. Subsequently, the new plant on Bog 591 on Lamèque Island opened in 1981.

PRESENT OWNERSHIP Fisons Western Corporation

RESERVES AND GRADE

Bog No.	Surficial (Mm^3)	Humified (Mm^3)
527	7.56	3.32
591	30.70	14.81
592	9.40	4.59
562	9.65	3.53

Bog areas include the following:

	Crown (ha)	Freehold (ha)	Total (ha)
Bog 527			
Total Bog	315	290	605
>1 m	240	137	377
(Bog 527 was abandoned in 1970-71 due to fire hazard to the Town of Shippagan.)			
Bog 591			
Total Bog	978	256	1234
>1 m	909	151	1060
In Production	288	55	343
Bog 592			
Total Bog	365	224	589
>1 m	318	82	400
In Production			
Bog 562			
Total Bog	373	168	541
>1 m	331	48	379
In Production	288	51	339

PRODUCTION The company produces baled peat and high compression peat and has an annual production capacity of 1 500 000 bale equivalents.

DEVELOPMENT Development was continued on Bog 591, which will lead to development on Bog 592.

EMPLOYEES 1985 - 3 to 30 persons

Grand Anse Peat Moss Co. Ltd.

COMPANY Grande Anse Peat Moss Co. Ltd., P. O. Box 90, Grande Anse, Gloucester County, New Brunswick E0B 1R0. Telephone: (506) 732-2854. The President is Paul Tocci; the Manager is Ernest Roy.

RIGHTS Peat Moss Lease No. 8 (166 ha) on Bog No. 561, under the Quarriable Substances Act, Chapter Q-1, R.S.N.B. 1968.

LOCATION Bog No. 561 is located 3 km southeast of Grande Anse (Figure 21).

HISTORY The company started block-cut peat operations in 1961 by hand cutting, but later converted to mechanization in 1966. The conversion to milled peat was begun in 1977.

PRESENT OWNERSHIP Grande Anse Peat Moss Co. Ltd.

RESERVES AND GRADE 4.13 Mm^3 surficial and 2.98 Mm^3 humified peat on a total bog area as follows:

	Crown (ha)	Freehold (ha)	Total (ha)
Total Bog	137	188	325
>1 m	118	125	243
In Production	114	77	191

PRODUCTION Company produces baled peat and peat mixes and has an annual production capacity of 170 000 bale equivalents.

DEVELOPMENT Continued production.

EMPLOYEES 1985 - 8 to 35 persons.

Heveco Ltd.

COMPANY Heveco Ltd., P. O. Box 30, Tabusintac, Northumberland County, New Brunswick E0C 2A0. Telephone: (506) 779-9277. The Manager is Myles Wishart.

RIGHTS Peat Moss Lease No. 9 (1080 ha) and No. 24 (174 ha) under the Quarriable Substances Act, Chapter Q-1, R.S.N.B. 1968.

LOCATION Bog No. 522 (Lease 24) is 2 km east of Brantville and Bog No. 524 (Lease 9) is 2 km southeast of Tabusintac (Figure 21).

HISTORY Incorporated in 1962, the company produces block-cut peat and peat mixes. Milled peat production commenced in 1981.

PRESENT OWNERSHIP Heveco Ltd.

RESERVES AND GRADE

Bog No.	Surficial (Mm^3)	Humified (Mm^3)
522	4.26	1.56
524	38.00	10.69

Bog areas include the following:

	Crown (ha)	Freehold (ha)	Total (ha)
Bog 522			
Total Bog	164	29	193
>1 m	145	16	161
In Production			
Bog 524			
Total Bog	909	327	1 236
>1 m	841	287	1 128
In Production	248	37	285

Bog 524 has numerous lakes throughout, which have caused drainage problems and thus reduced the area in production.

PRODUCTION The company produces block-cut peat and peat mixes and has an annual production capacity of 400 000 bale equivalents.

DEVELOPMENT Continued production from Bog No. 524.

EMPLOYEES 1985 - 3 to 61 persons.

Lamèque Peat Moss Ltd.

COMPANY Lamèque Peat Moss Ltd., P. O. Box 570, Lamèque, New Brunswick E0B 1V0. Telephone: (506) 779-9277. The Manager is Florent Chiasson.

RIGHTS Peat Moss Lease No. 14 (142 ha) on Bog No. 580 and Peat Moss Lease No. 28 (104 ha) on Bog No. 578, under the Quarriable Substances Act, Chapter Q-1, R.S.N.B. 1968.

LOCATION Bog No. 580 is 4 km north of Lamèque and Bog No. 578 is 2 km north of Petite-Lamèque, both in Gloucester County (Figure 21).

HISTORY The established in 1971, is producing milled peat.

PRESENT OWNERSHIP Lamèque Peat Moss Ltd.

RESERVES AND GRADE 7.09 Mm^3 of surficial and 2.27 Mm^3 of humified peat on a total bog area as follows:

	Crown (ha)	Freehold (ha)	Total (ha)
Bog 580			
Total Bog	130	91	221
>1 m	120	50	170
In Production	100	7	107
Bog 578			
Total Bog	63	22	85
>1 m	45	11	56
In Production	--	--	--

PRODUCTION The company produces milled peat and has an annual production capacity of 135 000 bale equivalents.

DEVELOPMENT Lamèque Peat Moss Ltd. continues to develop the Crown portion of the bog to its full potential. A Peat Moss Lease was obtained for Bog No. 578.

EMPLOYEES 1985 - 4 to 36 persons.

Pigeon Hill Peat Moss Ltd.

COMPANY Pigeon Hill Peat Moss Ltd., P. O. Box 639, Lamèque, New Brunswick E0B 1V0. Telephone: (506) 344-2440. The President is Edmond Chiasson.

RIGHTS Peat Moss Lease No. 18 (234 ha) on Bog No. 569 under the Quarriable Substances Act, Chapter Q-1, R.S.N.B. 1968.

LOCATION Bog No. 569 is located at Pigeon Hill on Lamèque Island, Gloucester County (Figure 21).

HISTORY Company acquired a Peat Lease in 1979.

PRESENT OWNERSHIP La Tourbe Pigeon Hill Ltée.

RESERVES AND GRADE 3.62 Mm^3 surficial and 2.17 Mm^3 humified peat on a total bog area as follows:

	Crown (ha)	Freehold (ha)	Total (ha)
Total Bog	250	40	290
>1 m	196	30	226
In Production	50	0	50

PRODUCTION The company produces milled peat and has an annual rated capacity of 110 000 bale equivalents.

DEVELOPMENT Pigeon Hill Peat Moss Ltd. continued to expand production fields as the market dictates.

EMPLOYEES 1985 - 1 to 15 persons.

Portage Peat Moss Ltd.

COMPANY Portage Peat Moss Ltd., P. O. Box 180, Rivière du Portage, Northumberland County, New Brunswick. Telephone: (506) 395-2215.

RIGHTS Peat Moss Lease No. 16 (272 ha) on Bog No. 517, under the Quarriable Substances Act, Chapter Q-1, R.S.N.B. 1968.

LOCATION Bog No. 517 is located 1.5 km east of Portage River, Northumberland County (Figure 21).

HISTORY The company, established in 1972, produces milled peat.

PRESENT OWNERSHIP Portage Peat Moss Ltd.

RESERVES AND GRADE 6.17 Mm^3 surficial and 1.03 Mm^3 humified peat on a total bog area as follows:

	Crown (ha)	Freehold (ha)	Total (ha)
Total Bog	243	9	252
>1 m	150	1	151
In Production	86	0	86

PRODUCTION The company has an annual production capacity of 190 000 bale equivalents.

DEVELOPMENT The bog continued to be developed at a rate consistent with market demand.

EMPLOYEES 1985 - 3 to 27 persons.

St. Raphael Peat Moss Ltd.

COMPANY St. Raphael Peat Moss Ltd., P. O. Box 570, Lamèque, New Brunswick E0B 1V0. Telephone: (506) 344-8530.

RIGHTS Peat Lease No. 17 (115 ha) on Bog No. 576, under the Quarriable Substances Act, Chapter Q-1, R.S.N.B. 1968.

LOCATION Bog 576 is 4 km east of Haut Lamèque, Lamèque Island (Figure 21).

HISTORY Acquired Peat Lease No. 17 in 1977.

PRESENT OWNERSHIP St. Raphael Peat Moss Ltd. is a 'sister' company of Lamèque Peat Moss Ltd.

RESERVES AND GRADE 3.65 Mm^3 surficial and 1.93 Mm^3 humified peat on a total bog area as follows:

	Crown (ha)	Freehold (ha)	Total (ha)
Total Bog	113	104	217
>1 m	105	35	140
In Production	105	25	130

PRODUCTION Company has an annual production capacity of 165 000 bale equivalents. Produces baled peat.

DEVELOPMENT Continued peat production with bog operating at capacity.

EMPLOYEES 1985 - 4 to 37 persons.

Theriault and Hachey Peat Moss Ltd.

COMPANY Theriault and Hachey Peat Moss Ltd., R. R. #1, Baie-Sainte-Anne, Northumberland County, New Brunswick E0C 1A0. Telephone: (506) 228-4530. The President is Isaac Theriault; the Vice-President is Gary Williston.

RIGHTS Peat Moss Lease No. 11 (332 ha) on Bog No. 324W and Peat Moss Lease No. 27 (125 ha) on Bog No. 302A under the Quarriable Substances Act, Chapter Q-1, R.S.N.B. 1968.

LOCATION Bog No. 324W is located 6 km south of Eel River Bridge and Bog No. 302A is located 7 km south of Eel River Bridge, both in Northumberland County (Figure 21).

HISTORY The company was formed in 1963, but block-cut peat had been produced from the site since 1961. In 1977 the block-cutting operation was converted to a milled peat operation. The company acquired the Peat Moss Lease on Bog No. 302A in 1985.

PRESENT OWNERSHIP Theriault and Hachey Peat Moss Ltd.

RESERVES AND GRADE 75.43 Mm^3 of surficial and 18.13 Mm^3 humified peat on a total bog area as follows:

	Crown (ha)	Freehold (ha)	Total (ha)
Bog 324W			
Total Bog	2 858	181	3039
>1 m	2 340	51	2391
In Production	90	2	92
Bog 302A			
Total Bog	233	Nil	233
>1 m	145	Nil	145
In Production	-	-	-

PRODUCTION The company has an annual production capacity of 200 000 bale equivalents.

DEVELOPMENT Theriault and Hachey Peat Moss Ltd. is attempting to open up new production fields.

EMPLOYEES 1985 - 2 to 33 persons.

Kent Peat Moss Ltd.

COMPANY Kent Peat Moss Ltd., R. R. #2, Saint-Paul, Kent County, New Brunswick E0A 2B0. Telephone: (506) 955-3098. The Manager is Eloi Maillet.

RIGHTS Peat Moss Lease No. 25 (393 ha) on Bog No. 41, under the Quarriable Substances Act, Chapter Q-1, R.S.N.B. 1968.

LOCATION Bog No. 41 is 0.6 km west of Birch Ridge, Kent County (Figure 21).

HISTORY The company acquired a Peat Exploration Licence in 1982 and converted to a Peat Moss Lease in 1983.

PRESENT OWNERSHIP Les Equipments Tardif Inc., 55, R. R. #1, St. Antonin, Riviére-du-loup, Quebec G0L 2J0. Telephone: (506) 862-7574. The President is Leonard Tardif.

RESERVES AND GRADE 4.76 Mm^3 surficial and 2.18 Mm^3 humified peat on a total bog area as follows:

	Crown (ha)	Freehold (ha)	Total (ha)
Total Bog	264	80	344
>1 m	163	53	216
In Production	100	-	100

PRODUCTION The company plans to achieve an annual rated capacity of 250 000 bale equivalents.

DEVELOPMENT Part of the bog was drained in 1983 and production commenced in 1984. The company continued to expand the bog in 1985.

EMPLOYEES 1985 - 1 to 24 persons.

Malpec Peat Moss Ltd.

COMPANY Malpec Peat Moss Ltd., P. O. Box 118, Rexton, New Brunswick E0A 1L0. Telephone: (506) 523-9161. The President is Solomon Curry.

RIGHTS Peat Moss Lease No. 20 (249 ha) on Bog No. 213 under the Quarriable Substances Act, Chapter Q-1, R.S.N.B. 1968.

LOCATION Bog No. 213 is located 3 km west of Rexton, Kent County (Figure 21).

HISTORY The company was issued a Peat Moss Lease (No. 20) in 1982. It commenced milled peat production in 1985.

PRESENT OWNERSHIP Malpec Peat Moss Ltd.

RESERVES AND GRADE 38.03 Mm^3 surficial and 5.0 Mm^3 humified peat on a total bog area as follows:

	Crown (ha)	Freehold (ha)	Total (ha)
Total Bog	1 777	488	2 265
>1 m	1 274	73	1 347
In Production	100	Nil	100

PRODUCTION The company has an annual production capacity of 250 000 bale equivalents.

DEVELOPMENT Malpec Peat Moss Ltd. began production and continued development of Bog 213.

EMPLOYEES 1985 - 4 to 50 persons.

POTASH/SALT[13]

Potash Company of America, Inc. 21 H/11W, 14W

COMPANY Potash Company of America, Inc., P. O. Box 1489, Sussex, New Brunswick E0E 1P0. Telephone: (506) 433-5445. The Executive Officer and President is P. Jack; the Mine Manager is Donald Roberts.

RIGHTS 19 187 ha Mining Lease, under Section 15(2) of Mining Act, Chapter M-14, R.S.N.B. 1973.

LOCATION The Potash Company of America mine/mill facility is located about 5 km east of Sussex, Kings County, on Highway 2 (Figure 21).

HISTORY Following the discovery of potash in the Plumweseep-Penobsquis area by the New Brunswick Department of Natural Resources in 1971, exploration and development rights covering a 360 km^2 reservation area were granted to the Potash Company of America in 1973. After a comprehensive exploration programme and feasibility study, the company decided to proceed with the construction of a 5 m diameter exploratory mine shaft in the spring of 1978. The exploration shaft was completed in April 1980 and underground exploration in October 1980. On October 27, 1980 the Potash Company of America announced that it was proceeding to production with a mine capacity of 900 000 t/a although initial capacity will be 630 000 t.

Mine development, mill construction and the Courtenay Bay potash shipping terminal in Saint John were completed in 1983. July 17, 1983 saw the first potash produced from the mill. The first shipment of potash through the port facility in Saint John took place early in 1984.

PRESENT OWNERSHIP Ideal Basic Industries, Ideal Plaza, 950 - 17th Street, P.O. Box 8789, Denver, Colorado 80201-8789

RESERVES AND GRADE Sufficient tonnage has been indicated by drilling to support a 1 000 000 t/a plant for 20 years or more.

PRODUCTION Potash and salt production, which commenced in 1983, continued throughout 1984 although potash production is proceeding at a reduced capacity due to problems with excess brine production and backfilling of tailings underground. Salt sales are handled by Iroquois Salt Products Ltd. under an agreement with PCA.

DEVELOPMENT A mine/mill upgrading plan was announced in 1985 for implementation in 1986. The plan is designed to increase current production levels.

In the latter part of 1984, Ideal Basic Industries Inc., the parent company of the Potash Company of America Ltd., announced that it was going to sell all its Canadian potash interests, including mines in New Brunswick and Saskatchewan, to Rio Algom Ltd.

Salt production levels were maintained at about 400 000 t/a.

Denison-Potacan Potash Company 21 H/12E

COMPANY Denison-Potacan Potash Company. P. O. Box 638, Sussex, New Brunswick E0E 1P0. Telephone: (506) 839-2146. The Chief Executive Officer is S. B. Roman. The Project Manager is A. J. Kyle.

RIGHTS 8.887 ha Mining Lease, under Section 15(2) of Mining Act, Chapter M-14, R.S.N.B. 1973.

LOCATION Denison-Potacan Potash Company is located about 20 km southwest of Sussex, Kings County (Figure 21).

HISTORY The Salt Springs potash-salt deposit was discovered by the Department of Natural Resources in 1973. Subsequent exploration and development rights to a 120 km^2 reservation area were granted to International Minerals and Chemical Corporation (IMC). Full-scale exploration (22 drill holes) began in 1975, and was successful in confirming a significant orebody.

Despite extremely encouraging results of the drilling programme, IMC decided to sell the property to Denison Mines Limited of Toronto late in 1978. Construction of a 5 m diameter exploration mine shaft was commenced in September 1979 and reached a target depth of 835 m by 1982.

In December 1980, Denison Mines Limited assigned a 40% interest to the Potash Company of Canada Limited (Potacan). Potacan is owned jointly by Entreprise Miniere et Chemique, and Kali und Salz Ag. Denison Mines Limited remains the overall development manager, with potash sales to be handled by Potacan.

A feasibility study completed in 1982 resulted in a production decision announcement on February 7, 1983.

Work on the No. 2 shaft, the production shaft, commenced in 1983, along with continued underground development and the construction of the surface infrastructure related to the mill facility, tailings storage, and brine disposal. By July, 1985 all pre-production work was completed and the first shipment of potash destined for Columbia was made on September 17, 1985.

PRESENT OWNERSHIP 60% Denison Mines Ltd., 40% Potash Company of Canada (Potacan).

RESERVES AND GRADE Underground exploration in 1982 has blocked out more than 41 000 000 t of 28.5% K_2O, sufficient for the initial 5 years of production. Together with the 22 surface drill holes, the underground work to date has established total reserves of 230 000 000 t (proven and possible).

PRODUCTION Production commenced in July 1985 with a rated capacity of 1 300 000 product tonnes annually.

DEVELOPMENT Following completion of the mill, CN rail spur line and brine pipeline to the Bay of Fundy, active production began in July, 1985.

EMPLOYEES Approximately 679 persons (average) have been employed during the construction phase. It is anticipated that the mine and mill will create full-time employment for up to 400 persons.

LIMESTONE/DOLOMITE[13]

Brookville Manufacturing Company Ltd. 21 H/5

COMPANY Brookville Manufacturing Company Ltd., P. O. Box 2332, Saint John, New Brunswick E2L 3V6. The Executive Officer and President is R. H. Oland; the Mine Manager is M. Sanford.

RIGHTS Original King's Land Grant

LOCATION Brookville, East Saint John, Saint John County. The quarry and crushing operation is located between Highway 1 (Sussex-Saint John Highway) and Highway 100 (Rothesay Highway) approximately 2 km east of their junction. Access to the quarry is via the Rothesay Highway (Figure 21).

HISTORY The company commenced operations over 60 years ago, primarily producing agricultural limestone and aggregate. It has been operating almost continuously since.

PRESENT OWNERSHIP R. H. Oland (Moosehead Breweries Ltd.).

RESERVES AND GRADE At present market levels adequate reserves of stone are estimated for at least 10 years. Although grade varies between areas of high-calcium limestone and dolomite throughout the quarry, the bulk of production is centred in the more dolomitic areas where grades fluctuate from 40 to 45% $MgCO_3$.

PRODUCTION The company produces agricultural dolomitic limestone, concrete, asphaltic aggregate and road metal (250 000 to 300 000 t annually).

DEVELOPMENT Continued operation.

EMPLOYEES 28 persons (average number).

LIMESTONE/GYPSUM[13]

Canada Cement Lafarge Ltd. 21 I/13W

COMPANY Canada Cement Lafarge Ltd., R. R. #1, Havelock, New Brunswick E0A 1W0. Telephone: (506) 534-2301. The Manager is Pierre Hebert.

RIGHTS 632.5 ha Mining Licence No. 1217 (includes existing plant and quarries); 205.5 ha Mining Licence No. 1168 (Springhill property); 302.7 ha Mining Licence No. 1090 (Intervale property). All Mining Licences are under the Mining Act, Chapter M-14, R.S.N.B. 1973.

LOCATION The limestone quarries and plant are located on Highway 880, about 5 km east of Havelock, Westmorland County (Figure 21).

The gypsum quarry is located less than 5 km north of Petitcodiac, Westmorland County.

HISTORY The limestone quarry near Havelock has been supplying raw material to the nearby cement plant since 1952. In 1983, the company announced plans to scale down its cement production at Havelock due to depressed market conditions. The operation of the cement kiln was subsequently suspended; however, the grinding plant continued to operate on a demand basis from stockpiles of clinker built up before the shutdown, as well as from clinker brought in periodically from another plant in Nova Scotia.

Initial quarrying of gypsum at Intervale began in 1880. The Albert Manufacturing Co. produced 1179 t/a (1,300 tons/year), between 1932 and 1935. In 1950, the property was acquired by Canada Cement Co. Ltd. who have worked the quarry periodically, supplying gypsum to the cement plant at Havelock.

PRESENT OWNERSHIP Canada Cement Lafarge Ltd. (Maritime Cement Ltd.)

RESERVES AND GRADE Reserves of high-grade limestone (i.e., 53% CaO) on property held under mining licence by Canada Cement have been estimated between 75 000 000 and 100 000 000 t.

At Intervale, reserves of 97% gypsum have been estimated at just less than 4 000 000 t.

PRODUCTION Historically, Canada Cement has produced approximately 200 000 to 300 000 t of limestone annually, primarily for use in cement manufacturing. Recently, production has included aggregate and some high-calcium stone sold to Havelock Processing Ltd.

Between 5 000 and 25 000 t/a gypsum have been produced from Intervale as required.

DEVELOPMENT One of two kilns operated during 1985. Grinding operations of stockpiled clinker continued on an intermittent basis, producing 60 000 t of clinker for specialty cement, i.e., oil well and sulphate resistant cements. Clinker for normal portland cement will continue to be brought in from Nova Scotia.

EMPLOYEES 50 to 70 persons.

LIMESTONE[13]

Elmtree Resources Ltd. 21 P/13W

COMPANY Elmtree Resources Ltd., P. O. Box 665, Bathurst, New Brunswick E2A 3Z6. Telephone: (506) 546-6382. The Executive Officer and President is A. Buzas; the Manager and Vice-President is G. M. Doucet.

RIGHTS 245.9 ha Mining Licence No. 1360, under Mining Act, Chapter M-14, R.S.N.B. 1973.

LOCATION The quarry is located about 20 km north of Bathurst near the Village of Petit Rocher, Gloucester County (Figure 21).

HISTORY A quarry has existed on this site since 1880 and was operated on a 1814 t/a (2,000 ton/year) basis from 1930 to 1960 by Elmtree Co-op. Since 1960, it was operated on an intermittent basis until 1978 when it was acquired by Elmtree Resources Limited. Following extensive trenching and mapping, the quarry was expanded to include a crushing and screening plant, and a large storage facility.

PRESENT OWNERSHIP Elmtree Resources Ltd.

RESERVES AND GRADE Reserves appear to be adequate in the explored area for at least 10 years operation at current production levels. The cutoff grade is 50% CaO.

PRODUCTION Approximately 60 000 t of limestone was quarried and crushed, and was primarily sold to the smelter at Belledune as flux, although some is marketed as agricultural lime and construction stone.

DEVELOPMENT Continued operation.

EMPLOYEES 10 persons (average number).

Havelock Lime Works Ltd. and Havelock Processing Ltd. 21 H/13W

COMPANY Havelock Lime Works Ltd. and Havelock Processing Ltd., P. O. Box 59, Havelock, New Brunswick E0E 1W0. Telephone: (506) 534-2311. The Executive Officer and President is A. Alward; the General Manager is L. Murray.

RIGHTS

50.9	ha Mining Licence No. 1129 (includes plant).
66.2	ha Mining Licence No. 1268 (undeveloped).
110.9	ha Mining Licence No. 1176 (undeveloped).
39.8	ha Mining Licence No. 1170 (operating quarry).
38.4	ha Mining Licence No. 1207 (operating quarry and processing facility).
97.1	ha Claim Block 260 (undeveloped).

All rights are under the Mining Act, Chapter M-14, R.S.N.B. 1973.

LOCATION The company operates a permanent quarry and processing facility about 5 km west of Petitcodiac and less than 1 km east of the Village of Havelock, respectively (Figure 21).

HISTORY Havelock Lime Works Ltd. has been quarrying in the area since 1939. The company was incorporated in 1964 and in 1970 a subsidiary company, Havelock Processing Ltd., was formed to manage the manufacturing of quick and hydrated lime. More recently, Dickenson Mines Ltd. acquired 60% interest in the Havelock group of companies in 1983. The company plans to acquire the balance of the operation within the next three years.

PRESENT OWNERSHIP Dickenson Mines Ltd., 60%; and A. Alward, 40%.

RESERVES AND GRADE Less than 1 000 000 t of 95% $CaCO_3$ remain at Havelock's Samphill quarry following current extraction practices. However, this tonnage can be increased if a greater overburden-to-stone stripping ratio can be economically achieved.

PRODUCTION The company has traditionally produced about 250 000 to 300 000 t of stone annually. Chemical process stone (for use as flux in nonferrous smelters, glass industry, pulp and paper mills and fibreglass), pulverized stone (for use in dusting mines and agricultural purposes), poultry grit, and crushed stone (for use as concrete aggregate and general construction) are all listed products.

DEVELOPMENT Expansion plans are underway at the company's Samphill quarry to increase reserves. No decision was made regarding construction of a new kiln.

EMPLOYEES 34 persons (average number).

SILICA[13]

Chaleur Silica Limited 21 P/12E

COMPANY Chaleur Silica Limited, P. O. Box 4, Site 4, Petit Rocher, New Brunswick E0B 2E0. Telephone: (506) 783-2387. The Executive Officer, President and Manager is Jean Claude Godin.

RIGHTS Original King's Land Grant.

LOCATION Quarry located approximately 6.5 km east of Bathurst, Gloucester County, south of Highway 11 (Figure 21).

HISTORY The property was originally explored by East Coast Smelting and Chemical Company in 1961; however, the property remained undeveloped until 1974, when World Wide Explorations opened a small quarry. The quarry was purchased by Godin M-E in 1976 and is now operated under the name of Chaleur Silica Limited. It has since been expanded and modernized. A sandblast sand plant, with 77-91 t/d (85-100 tons/day) capacity of bagged sand, was installed in 1979.

In 1983, the company drilled five holes on a second property adjacent to the Nepisiguit River and intersected 10 m of silica similar to that already being quarried.

PRESENT OWNERSHIP The deposit is owned by A. Ronalds and G. Ronalds under an original King's Grant and mined under an agreement with Chaleur Silica Limited.

RESERVES AND GRADE Reserves are estimated to be in excess of 500 000 t of 95% SiO_2; however, most is inaccessible due to ownership problems.

PRODUCTION The quarry operates on a seasonal basis and has produced up to 60 000 t of silica annually. Markets are almost entirely dependent on the sale of silica flux to the smelter at Belledune; however, some blasting sand and nursery sand has been produced.

DEVELOPMENT Continued operation at a reduced level.

EMPLOYEES 14 persons (average number).

CLAY PRODUCTS[13]

L.E. Shaw Limited 21 I/4

COMPANY L.E. Shaw Limited, Head Office: P. O. Box 2130, Lantz, Nova Scotia B0N 1R0. Plant and Quarry Office: P. O. Box 188, Chipman, New Brunswick E0E 1C0. Telephone: (506) 339-6605. The Manager is George Roberts.

RIGHTS The company owns about 40 ha of land. Quarriable substances are vested in the owner of the land in or on which they lie.

LOCATION The quarry is located about 3 km east of the plant, in Chipman, New Brunswick (Figure 21).

HISTORY In 1929, the company opened a plant in the heart of the Minto coal field at Chipman to use waste shales from the coal mines in making brick and tile. Since 1935, raw material for the plant has been obtained from the shale quarry.

PRESENT OWNERSHIP L. E. Shaw Limited.

RESERVES AND GRADE Material is removed from the Hurley Creek Formation and consists of purple-red sandstone, shale and siltstone.

PRODUCTION A preliminary estimate of the total value of clay product production in New Brunswick for 1985 is $4 325 000, compared to $3 300 000 in 1984.

DEVELOPMENT The company continued to operate a brick plant using local red shale. The plant produces facing brick, drainage tile, partition tile, radial tile and an interlocking tile. Quality acid-resistant brick can also be produced.

EMPLOYEES An average of 25 persons for both the quarry operation and manufacturing sector.

PROCESSED (DIMENSION) STONE[13]

Nelson Monuments Ltd. 21 H/12

COMPANY Nelson Monuments Ltd., P. O. Box 1220, Sussex, New Brunswick, E0E 1P0. Telephone: (506) 433-3413. Mr. Merrill Nelson is the President.

RIGHTS Quarriable substances are vested in the owner of the land in or on which they lie.

LOCATION The plant is located in Sussex, New Brunswick (Figure 21), but quarries have been operated in various places: Charlotte County, Hampstead, and Vermillion Bay (Ontario).

HISTORY The company was founded in 1909 and in 1959 it moved from Hopewell Cape to Sussex.

DEVELOPMENT The company continued to produce monuments, markers and curbing stone, although much of the granite used was imported from Ontario and South Africa.

EMPLOYEES 25 persons (average number).

Smith Cut Stone and Quarries Limited 21 I/2

COMPANY Smith Cut Stone and Quarries Limited, P. O. Box 69, Shediac, New Brunswick E0A 3G0. Telephone: (506) 532-6902. The President is Roy E. LeBlanc.

RIGHTS Quarriable substances are vested in the owner of the land in or on which they lie.

LOCATION Shediac, New Brunswick (Figure 21).

HISTORY Founded in 1818, this is the oldest stone quarrying company in New Brunswick. It has provided building stone for numerous construction projects, including Moncton's Cathedral. For the last 25 years it has mainly provided cut stone for restoration.

DEVELOPMENT The company continued to operate a local sandstone quarry and was involved in restoration projects in Boston, and New York and Calgary.

EMPLOYEES 1 to 15 persons in 1985.

CRUSHED STONE[12]

Major operations producing crushed stone for use as aggregate are centred around the Fredericton and Moncton areas. Both of these areas are deficient in good quality, coarse, surficial granular aggregate materials.

In the Fredericton area, Diamond Construction Limited maintains a crushing operation at Springhill, on the south side of the Saint John River. The material crushed is a Silurian greywacke. On the north side of the river, Forbes and Sloat Limited crushes Mississippian basalt at a quarry at Douglas, just west of Fredericton.

In the Moncton area, Moncton Crushed Stone Company Limited, a subsidiary of Modern Enterprises, crushes granitic rocks of Precambrian age at a quarry at Stilesville, northwest of the city. This company also produces manufactured fine concrete aggregate by blending crusher-produced fine aggregate with washed natural sand trucked in from the Rogersville area. H. E. Carson Limited also produces crushed stone from the Stilesville area. To the east of Moncton, at Gaytons, Precambrian granitic rocks are crushed by Acadia Crushed Stone Limited, another subsidiary of Modern Enterprises, and by MacDonald's Paving and Construction Limited.

In addition to the above, Brookville Manufacturing Company Limited of Brookville, near Saint John, and Havelock Lime Works of Havelock, produce crushed dolomite and limestone, respectively, for use as aggregate, in addition to their other lime products.

Preliminary estimates of stone production for 1985 (Statistics Canada figures) are 2 060 000 t with a value of $11 120 000. In comparison, 1984 production was 2 005 000 t valued at $10 940 000.

SAND AND GRAVEL[12, 15]

The rights to surficial granular aggregate materials in New Brunswick are vested in the landowners. Consequently, permission of the land owner is required for sand and gravel extraction. Approximately 42% of the land area is controlled by the Province. Removal of sand and gravel from this land is regulated under the Quarriable Substances Act, with permits being issued by the Minister of Natural Resources.

Preliminary estimates of sand and gravel production in New Brunswick during 1985 (Statistics Canada figures) are 7 600 000 t, with a value of $9 700 000. In comparison, production in 1984 was estimated at 5 410 000 t valued at $10 275 000.

Production of sand and gravel from Crown land and designated areas was 3 020 000 t with a value of $3 780 000, compared to 2 260 000 valued at $4 290 000 in 1984.

ENERGY RESOURCES[10]

Oil and natural gas continued to be produced in limited quantities from the Stoney Creek field about 16 km south of Moncton.

N.B. Coal Ltd. continued production from the Minto coalfields at about the same level as in 1984.

OIL AND NATURAL GAS

Moncton Utility Gas Company 21 H/15

COMPANY Moncton Utility Gas Company, 382 St. George Street, Moncton, New Brunswick E1C 1X2. Telephone: (506) 855-9901. The manager is P. Furlong.

RIGHTS Gas production under ONG Onshore Lease 74-1 of the Oil and Natural Gas Act, Chapter O-2.1, R.S.N.B. 1976.

LOCATION The Stoney Creek field is located 16 km south of Moncton, Albert County (Figure 18).

HISTORY In 1899, the New Brunswick Petroleum Company Limited was organized. Frederick W. Sumner and Mathew Lodge were president and secretary, respectively. The company procured a licence to prospect and develop oil and gas on an area of 46 619.8 km^2 (18,000 square miles) for 5 years. An extension of 5 years was to be granted should the company meet certain conditions, one of which was an expenditure of $100 000. Upon termination of the 5-year extension, Lease 115 was granted specifying that the New Brunswick Petroleum Company Limited had drilling rights to 25 899.9 km^2 (10,000 square miles) for a term of 99 years with a renewal clause for an additional 99 years.

Investigations for the New Brunswick Petroleum Company Limited were conducted by Professor N. S. Shaler, H. B. Goodrich, R. H. Oliphant and others. From 1900 to 1906, 72 wells were drilled in the Dover and St. Joseph areas, one at Beersville in Kent County, and four between the Petitcodiac River and the present Stoney Creek field.

The five wells drilled outside the Dover-St. Joseph area were unsuccessful in locating commercial oil and gas.

Appendix 1.
Metric Abbreviations and Conversion Factors

ABBREVIATIONS

cm - centimetre
m - metre
km - kilometre
g - gram
t - tonne
L - litre
ha - hectare
mgal - milligal
Hz - Hertz
M - mega (prefix for 1 000 000)

CONVERSION FACTORS

For precious metals:
ounces per ton (oz./ton) x 34.285 71 = grams per tonne (g/t)

Square miles (sq. mi.)x 2.589 988 = square kilometres (km^2)

Short tons x 0.907 184 = tonnes (t)

Acres (ac.) x 0.404 685 = hectares (ha)

For oil (1 barrel = 42 U. S. gallons):
barrels x 0.158 987 3 = cubic metres (m^3)